

S East Helena
363.7392 source apportionment
Helena study
1982

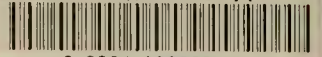
Vol 13

Particulate Source Apportionment
Analysis Using the Chemical Mass Balance
Receptor Model

VOLUME III

APPENDICES

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SOURCE APPORTIONMENT STUDY

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Particulate Source Apportionment
Analysis Using the Chemical Mass Balance
Receptor Model

VOLUME III

APPENDICES

Prepared for
Department of Health and Environmental Sciences
State of Montana

By

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NEA, INC.
8310 S.W. Nimbus Avenue
Beaverton, Oregon 97005

September, 1982

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APPENDICES

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Ambient Sampling Site List

01	CANAL
02	DARTMAN
03	FIREHALL
04	HADFIELD
05	HASTIE
06	HIGHWAY
07	MICROWAVE
09	MUFFICK
10	PADBURY
11	SOUTH
12	VOLLMER



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Appendix I

Mean Quarterly CMB Results by Site and Size Fraction
(All Valid and Co-Collected Samples)

USER: E400

X1 F

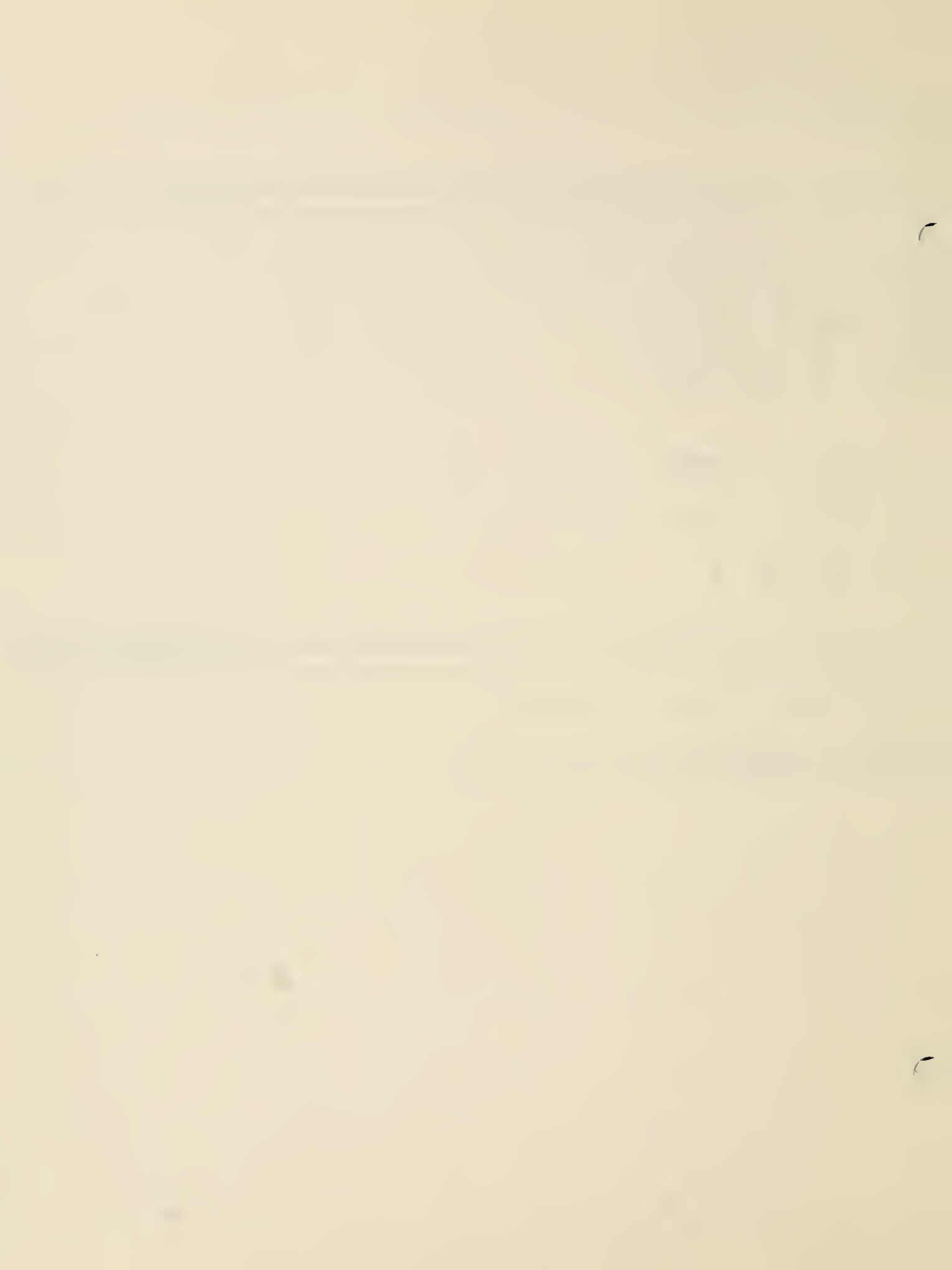
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STARTED: 06/22/82 13:35, ON: CE2P BY: Q



CHBDED RESULTS FOR CHB # BF1.1

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 2.477 D OF F: 5

CODE SOURCE FLG UG/M3 %

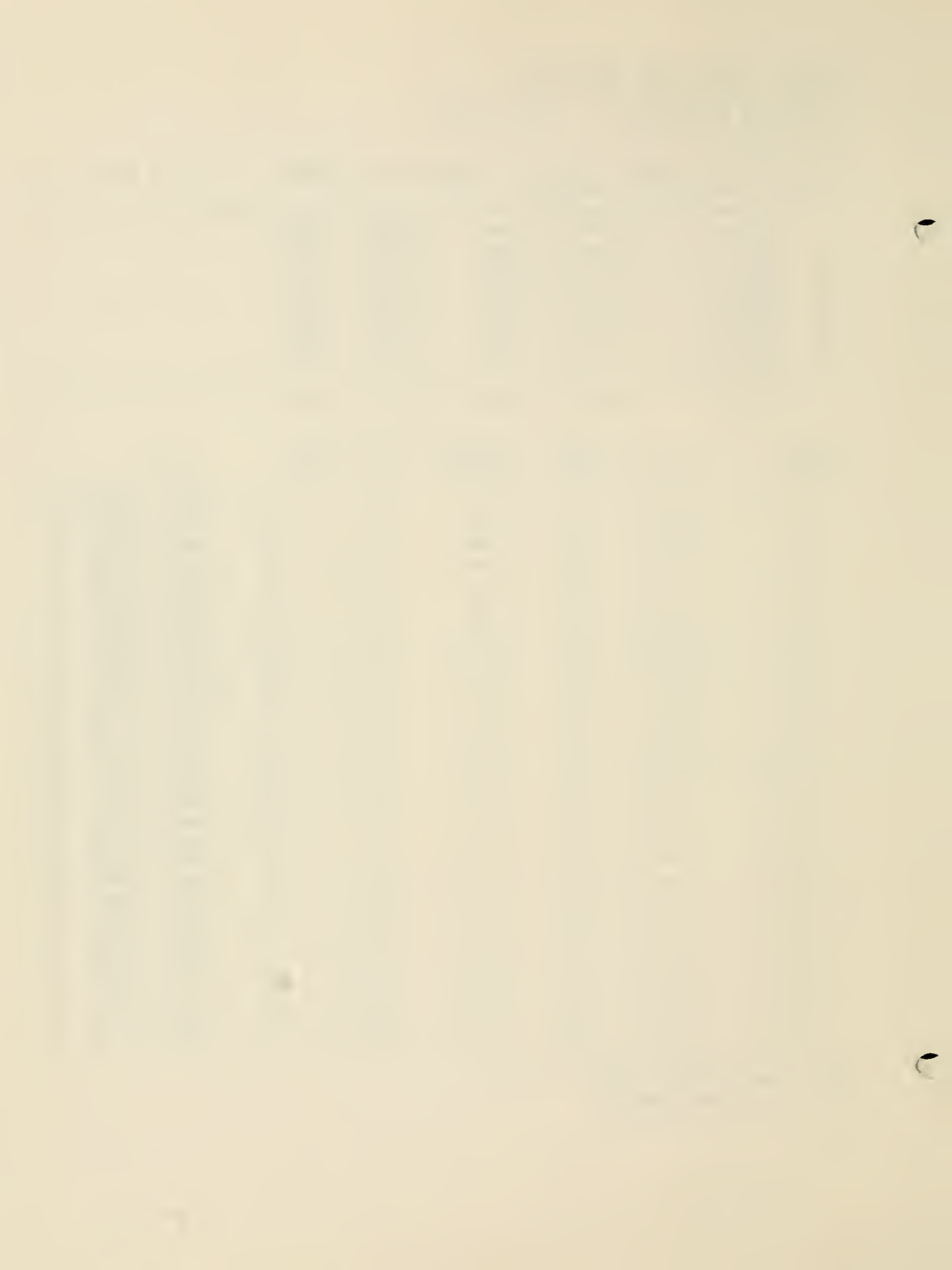
1	TRANS	*	0.194+- 0.090	1.829+- 0.915
12	GEO-J	*	0.802+- 0.108	7.572+- 1.737
26	LIME	*	0.123+- 0.078	1.161+- 0.771
64	ZHBLD	*	1.500+- 0.357	14.168+- 4.275
65	DRBLD	*	0.134+- 0.048	1.265+- 0.515
67	BLFUP	*	0.155+- 0.106	1.462+- 1.039
74	CUKST	*	0.114+- 0.032	1.077+- 0.362
77	SECSO	*	2.214+- 0.450	20.910+- 5.759

TOTAL: 5.235+- 0.608 49.442+-10.839

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO	
1 AL *	0.104+- 0.013	0.978	0.097+- 0.007	0.938+-0.098	AL	
2 SI *	0.252+- 0.037	2.380	0.271+- 0.022	1.076+-0.127	SI	
3 P	0.041+- 0.005	0.383	0.008+- 0.000	0.186+-0.012	P	
4 S *	0.645+- 0.093	6.092	0.645+- 0.054	1.000+-0.119	S	
5 CL	0.027+- 0.005	0.260	0.038+- 0.005	1.392+-0.303	CL	
6 K *	0.101+- 0.015	0.951	0.047+- 0.008	0.469+-0.084	K	
7 CA *	0.091+- 0.020	0.864	0.091+- 0.007	0.993+-0.106	CA	
8 TI *	0.004+- 0.001	0.035	0.004+- 0.000	1.023+-0.113	TI	
9 Y	0.000+- 0.000	0.002	0.000+- 0.000	1.448+-0.548	Y	
10 CR	0.001+- 0.000	0.009	0.000+- 0.000	0.338+-0.074	CR	
11 MH	0.001+- 0.000	0.007	0.002+- 0.000	2.272+-0.618	MH	
12 FE *	0.039+- 0.006	0.373	0.041+- 0.003	1.045+-0.119	FE	
13 NI	0.001+- 0.000	0.012	0.001+- 0.000	1.034+-0.112	NI	
14 CU *	0.070+- 0.016	0.657	0.070+- 0.006	1.003+-0.126	CU	
15 ZN *	0.302+- 0.084	2.857	0.369+- 0.034	1.219+-0.179	ZN	
16 AS *	0.100+- 0.026	0.948	0.099+- 0.008	0.989+-0.111	AS	
17 SE	0.001+- 0.000	0.009	0.001+- 0.000	0.842+-0.099	SE	
18 BR *	0.015+- 0.003	0.145	0.014+- 0.005	0.909+-0.445	BR	
19 SR	0.001+- 0.000	0.009	0.001+- 0.000	0.552+-0.103	SR	
20 PD	0.000+- 0.000	0.002	0.009+- 0.001	9.999+-9.999	PD	
21 AG	0.001+- 0.001	0.009	0.003+- 0.000	3.314+-1.509	AG	
22 CD *	0.043+- 0.021	0.410	0.033+- 0.003	0.757+-0.076	CD	
23 IN	0.001+- 0.001	0.003	0.000+- 0.001	0.260+-0.822	IN	
24 SN	0.003+- 0.003	0.017	0.008+- 0.001	2.398+-0.697	SN	
25 SB	0.008+- 0.003	0.075	0.013+- 0.002	1.655+-0.453	SB	
26 BA	0.015+- 0.008	0.141	0.002+- 0.003	0.133+-0.206	BA	
27 HG	0.001+- 0.000	0.011	0.001+- 0.000	0.920+-0.141	HG	
28 PB *	0.226+- 0.054	2.139	0.283+- 0.018	1.248+-0.128	PB	

MEAS. AMB. MASS (UG/M3): 10.6

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF1.1C

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 2.410 D OF F: 5

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.216+-	0.101	1.887+-	0.948
12	GED-J	*	0.743+-	0.099	6.534+-	1.507
26	LIME	*	0.098+-	0.057	0.857+-	0.527
64	ZNBLD	*	1.719+-	0.397	14.985+-	4.473
65	DRBLD	*	0.152+-	0.054	1.324+-	0.531
67	BLFUP	*	0.178+-	0.120	1.548+-	1.084
74	CUKST	*	0.122+-	0.036	1.062+-	0.370
77	SECSO	*	2.427+-	0.474	21.157+-	5.756

TOTAL:			5.661+-	0.651	49.355+-	10.930
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO			
1 AL *	0.102+-	0.010	0.887	0.095+-	0.007	0.938+-	0.096	AL
2 SI *	0.243+-	0.029	2.121	0.263+-	0.021	1.083+-	0.125	SI
3 P	0.043+-	0.006	0.378	0.008+-	0.001	0.187+-	0.012	P
4 S *	0.708+-	0.096	6.172	0.708+-	0.060	1.000+-	0.119	S
5 CL	0.030+-	0.006	0.261	0.043+-	0.006	1.432+-	0.324	CL
6 K *	0.105+-	0.015	0.920	0.051+-	0.009	0.487+-	0.092	K
7 CA *	0.082+-	0.014	0.713	0.081+-	0.007	0.996+-	0.113	CA
8 TI *	0.004+-	0.000	0.032	0.004+-	0.000	1.002+-	0.106	TI
9 Y	0.000+-	0.000	0.002	0.000+-	0.000	1.447+-	0.531	Y
10 CR	0.001+-	0.000	0.008	0.000+-	0.000	0.364+-	0.072	CR
11 MN	0.001+-	0.000	0.005	0.002+-	0.000	2.595+-	0.840	MN
12 FE *	0.039+-	0.005	0.338	0.040+-	0.003	1.037+-	0.114	FE
13 NI	0.001+-	0.000	0.012	0.002+-	0.000	1.077+-	0.114	NI
14 CU *	0.074+-	0.018	0.648	0.075+-	0.007	1.004+-	0.126	CU
15 ZH *	0.340+-	0.093	2.967	0.420+-	0.039	1.235+-	0.184	ZH
16 AS *	0.113+-	0.029	0.989	0.112+-	0.009	0.990+-	0.111	AS
17 SE	0.001+-	0.000	0.009	0.001+-	0.000	0.845+-	0.095	SE
18 BR *	0.017+-	0.004	0.148	0.015+-	0.006	0.905+-	0.447	BR
19 SR	0.001+-	0.000	0.010	0.001+-	0.000	0.487+-	0.082	SR
20 PD	0.000+-	0.000	0.002	0.010+-	0.001	9.999+-	9.999	PD
21 AG	0.001+-	0.001	0.009	0.003+-	0.000	3.363+-	1.353	AG
22 CD *	0.050+-	0.024	0.436	0.037+-	0.003	0.745+-	0.075	CD
23 IH	0.001+-	0.001	0.004	0.000+-	0.001	0.261+-	0.672	IH
24 SN	0.004+-	0.004	0.018	0.010+-	0.001	2.324+-	0.610	SN
25 SB	0.009+-	0.004	0.080	0.015+-	0.002	1.597+-	0.400	SB
26 BA	0.017+-	0.009	0.152	0.002+-	0.003	0.120+-	0.164	BA
27 HG	0.001+-	0.001	0.012	0.001+-	0.000	0.882+-	0.121	HG
28 PB *	0.257+-	0.059	2.237	0.319+-	0.021	1.242+-	0.128	PB

MEAS. AMB. MASS (UG/M3): 11.5

* - FITTING ELEMENT



CM8DEQ RESULTS FOR CMB # 0F1.2

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.108 D OF F: 5

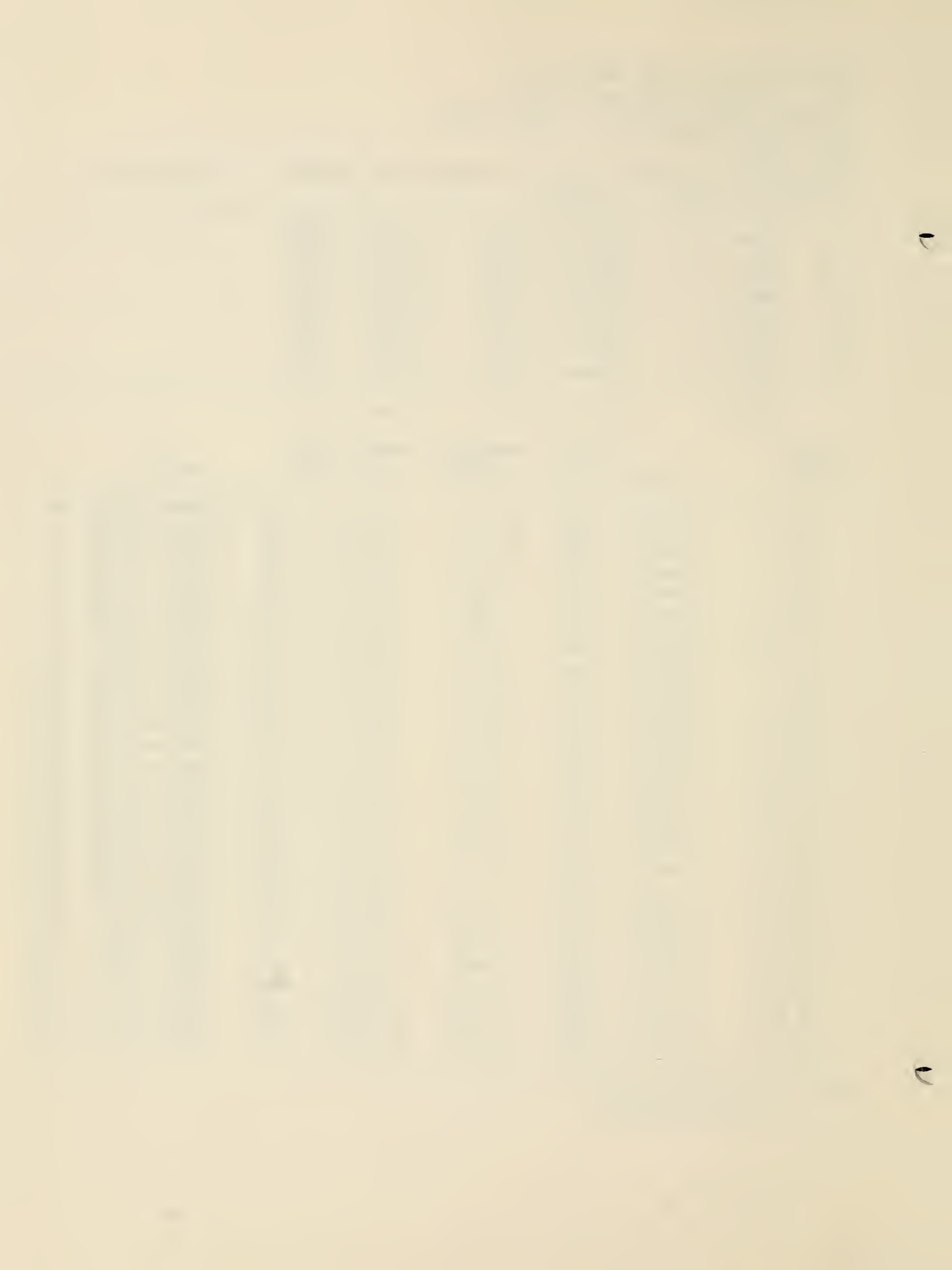
CODE	SOURCE	FLG	UG/M3	%
1	TRANS	*	0.108+- 0.046	2.176+- 0.955
6	GEO-D	*	0.393+- 0.285	7.944+- 5.839
12	GEO-J	*	0.880+- 0.285	17.774+- 6.111
64	ZNBLD	*	0.666+- 0.166	13.459+- 3.708
65	DRBLD	*	0.072+- 0.025	1.447+- 0.538
67	BLFUP	*	0.205+- 0.071	4.146+- 1.517
74	CUKST	*	0.055+- 0.022	1.116+- 0.467
77	SECSO	*	1.538+- 0.233	31.081+- 5.928

TOTAL: 3.916+- 0.503 79.145+-13.691

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 AL *	0.147+- 0.053	2.973	0.139+- 0.009	0.944+-0.087	AL
2 SI *	0.436+- 0.208	8.803	0.423+- 0.029	0.972+-0.092	SI
3 P	0.028+- 0.002	0.560	0.008+- 0.000	0.275+-0.017	P
4 S *	0.462+- 0.040	9.333	0.462+- 0.038	1.000+-0.116	S
5 CL	0.006+- 0.003	0.125	0.025+- 0.003	4.058+-1.990	CL
6 K *	0.046+- 0.010	0.936	0.040+- 0.004	0.869+-0.106	K
7 CA *	0.059+- 0.014	1.190	0.059+- 0.005	0.998+-0.130	CA
8 TI *	0.005+- 0.002	0.101	0.006+- 0.000	1.111+-0.111	TI
9 V	0.000+- 0.000	0.010	0.000+- 0.000	0.726+-0.165	V
10 CR	0.001+- 0.000	0.014	0.000+- 0.000	0.356+-0.100	CR
11 MH	0.002+- 0.001	0.040	0.002+- 0.000	0.930+-0.105	MH
12 FE *	0.053+- 0.018	1.067	0.059+- 0.004	1.108+-0.113	FE
13 NI	0.000+- 0.000	0.006	0.001+- 0.000	2.581+-0.700	NI
14 CU *	0.036+- 0.012	0.732	0.036+- 0.003	1.001+-0.118	CU
15 ZN *	0.176+- 0.035	3.563	0.182+- 0.015	1.032+-0.125	ZN
16 AS *	0.058+- 0.014	1.170	0.058+- 0.004	0.999+-0.104	AS
17 SE	0.001+- 0.000	0.016	0.001+- 0.000	0.659+-0.085	SE
18 BR *	0.008+- 0.001	0.172	0.009+- 0.003	1.000+-0.466	BR
19 SR	0.000+- 0.000	0.010	0.000+- 0.000	0.848+-0.248	SR
20 PD	< 0.001	---	0.005+- 0.000	0.000+-0.000	PD
21 AG	0.000+- 0.000	0.004	0.002+- 0.000	4.403+-4.506	AG
22 CD *	0.037+- 0.014	0.758	0.039+- 0.003	1.027+-0.131	CD
23 IN	0.002+- 0.001	0.040	0.000+- 0.001	0.062+-0.313	IN
24 SH	0.004+- 0.002	0.085	0.005+- 0.001	1.159+-0.287	SH
25 SB	0.006+- 0.004	0.119	0.008+- 0.002	1.272+-0.419	SB
26 BA	0.014+- 0.008	0.279	0.002+- 0.003	0.124+-0.249	BA
27 HG	0.001+- 0.000	0.026	0.001+- 0.000	0.607+-0.108	HG
28 PB *	0.207+- 0.043	4.175	0.207+- 0.012	1.002+-0.082	PB

MEAS. AMB. MASS (UG/M3): 4.9

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF1.2C

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.140 D OF F: 5

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.096+- 0.046	1.783+- 0.910
6	GEO-D	*	0.591+- 0.495	10.963+- 9.395
12	GEO-J	*	0.973+- 0.477	18.034+- 9.448
64	ZHBLD	*	0.577+- 0.224	10.693+- 4.591
65	DRBLD	*	0.073+- 0.039	1.352+- 0.766
67	BLFUP	*	0.087+- 0.053	1.607+- 1.032
74	CUKST	*	0.037+- 0.029	0.681+- 0.556
77	SECSO	*	1.703+- 0.301	31.572+- 8.057

TOTAL:			4.137+- 0.788	76.686+-20.322
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO	
1 AL *	0.180+- 0.096		3.346	0.171+- 0.012	0.949+-0.088	AL
2 SI *	0.585+- 0.378		10.841	0.530+- 0.036	0.906+-0.083	SI
3 P	0.030+- 0.003		0.560	0.007+- 0.000	0.241+-0.016	P
4 S *	0.478+- 0.059		8.863	0.478+- 0.042	1.000+-0.123	S
5 CL	0.002+- 0.002		0.044	0.019+- 0.002	7.983+-6.946	CL
6 K *	0.053+- 0.018		0.981	0.041+- 0.003	0.777+-0.083	K
7 CA *	0.065+- 0.025		1.199	0.065+- 0.006	0.998+-0.129	CA
8 TI *	0.005+- 0.003		0.102	0.007+- 0.000	1.241+-0.133	TI
9 V	0.000+- 0.000		0.007	0.000+- 0.000	1.097+-0.283	V
10 CR	0.000+- 0.000		0.002	0.000+- 0.000	1.246+-0.594	CR
11 MH	0.002+- 0.001		0.044	0.002+- 0.000	0.904+-0.095	MH
12 FE *	0.062+- 0.033		1.146	0.072+- 0.005	1.159+-0.120	FE
13 NI	< 0.001		---	0.001+- 0.000	0.000+-0.000	NI
14 CU *	0.026+- 0.016		0.488	0.026+- 0.002	1.001+-0.109	CU
15 ZH *	0.146+- 0.052		2.699	0.154+- 0.013	1.059+-0.133	ZH
16 AS *	0.054+- 0.022		1.009	0.054+- 0.004	0.998+-0.111	AS
17 SE	0.001+- 0.000		0.013	0.000+- 0.000	0.630+-0.099	SE
18 BR *	0.008+- 0.002		0.145	0.008+- 0.003	1.001+-0.454	BR
19 SR	0.001+- 0.000		0.011	0.000+- 0.000	0.665+-0.208	SR
20 PD	< 0.001		---	0.004+- 0.000	0.000+-0.000	PD
21 AG	0.001+- 0.001		0.007	0.002+- 0.000	2.187+-1.533	AG
22 CD *	0.019+- 0.009		0.345	0.019+- 0.002	1.025+-0.123	CD
23 IN	0.004+- 0.002		0.067	0.000+- 0.001	0.023+-0.197	IN
24 SH	0.003+- 0.002		0.057	0.004+- 0.001	1.243+-0.439	SH
25 SB	0.008+- 0.008		0.072	0.007+- 0.002	0.930+-0.302	SB
26 BA	0.013+- 0.009		0.243	0.002+- 0.004	0.125+-0.296	BA
27 HG	0.001+- 0.001		0.020	0.001+- 0.000	0.595+-0.135	HG
28 PB *	0.152+- 0.060		2.810	0.148+- 0.008	0.978+-0.075	PB

MEAS. AMB. MASS (UG/M3): 5.4

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # QF1.2D

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

DICHOT-HIVOL CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.100 D OF F: 5

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.105+- 0.045	2.115+- 0.949
6	GEO-D	*	0.392+- 0.312	7.907+- 6.363
12	GEO-J	*	0.861+- 0.309	17.349+- 6.599
64	ZHBLD	*	0.670+- 0.178	13.495+- 3.976
65	DRBLD	*	0.076+- 0.028	1.527+- 0.592
67	BLFUP	*	0.196+- 0.078	3.952+- 1.646
74	CUXST	*	0.037+- 0.019	0.747+- 0.386
77	SECSO	*	1.552+- 0.247	31.281+- 6.372

TOTAL:	3.889+- 0.543	78.373+-14.794
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.147+- 0.058	2.964	0.137+- 0.009	0.933+-0.085	AL	
2 SI *	0.442+- 0.232	8.910	0.418+- 0.028	0.946+-0.088	SI	
3 P	0.028+- 0.002	0.556	0.007+- 0.000	0.270+-0.017	P	
4 S *	0.462+- 0.044	9.319	0.462+- 0.038	1.000+-0.117	S	
5 CL	0.004+- 0.002	0.079	0.024+- 0.003	6.250+-4.696	CL	
6 K *	0.046+- 0.011	0.919	0.040+- 0.004	0.872+-0.108	K	
7 CA *	0.058+- 0.016	1.165	0.058+- 0.005	0.995+-0.130	CA	
8 TI *	0.005+- 0.002	0.101	0.005+- 0.000	1.097+-0.109	TI	
9 V	0.000+- 0.000	0.010	0.000+- 0.000	0.718+-0.162	V	
10 CR	0.001+- 0.000	0.014	0.000+- 0.000	0.349+-0.098	CR	
11 MH	0.002+- 0.001	0.040	0.002+- 0.000	0.915+-0.102	MH	
12 FE *	0.051+- 0.020	1.020	0.058+- 0.004	1.141+-0.118	FE	
13 NI	0.000+- 0.000	0.006	0.001+- 0.000	2.442+-0.655	NI	
14 CU *	0.026+- 0.010	0.530	0.026+- 0.002	1.001+-0.110	CU	
15 ZH *	0.179+- 0.038	3.607	0.182+- 0.015	1.016+-0.123	ZH	
16 AS *	0.060+- 0.015	1.209	0.060+- 0.004	0.998+-0.106	AS	
17 SE	0.001+- 0.000	0.014	0.001+- 0.000	0.747+-0.099	SE	
18 BR *	0.008+- 0.001	0.167	0.008+- 0.003	0.999+-0.465	BR	
19 SR	0.000+- 0.000	0.010	0.000+- 0.000	0.831+-0.241	SR	
20 PD	< 0.001	---	0.005+- 0.000	0.000+-0.000	PD	
21 AG	0.000+- 0.000	0.005	0.002+- 0.000	3.564+-2.903	AG	
22 CD *	0.038+- 0.015	0.770	0.037+- 0.003	0.969+-0.120	CD	
23 IN	0.002+- 0.001	0.044	0.000+- 0.001	0.056+-0.279	IN	
24 SH	0.004+- 0.002	0.079	0.005+- 0.001	1.239+-0.316	SH	
25 SB	0.006+- 0.005	0.131	0.008+- 0.002	1.182+-0.363	SB	
26 BA	0.008+- 0.006	0.161	0.002+- 0.003	0.210+-0.426	BA	
27 HG	0.001+- 0.000	0.026	0.001+- 0.000	0.605+-0.106	HG	
28 PB *	0.194+- 0.047	3.909	0.203+- 0.012	1.045+-0.087	PB	

MEAS. AMB. MASS (UG/M3): 5.0

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # 9F1 3

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

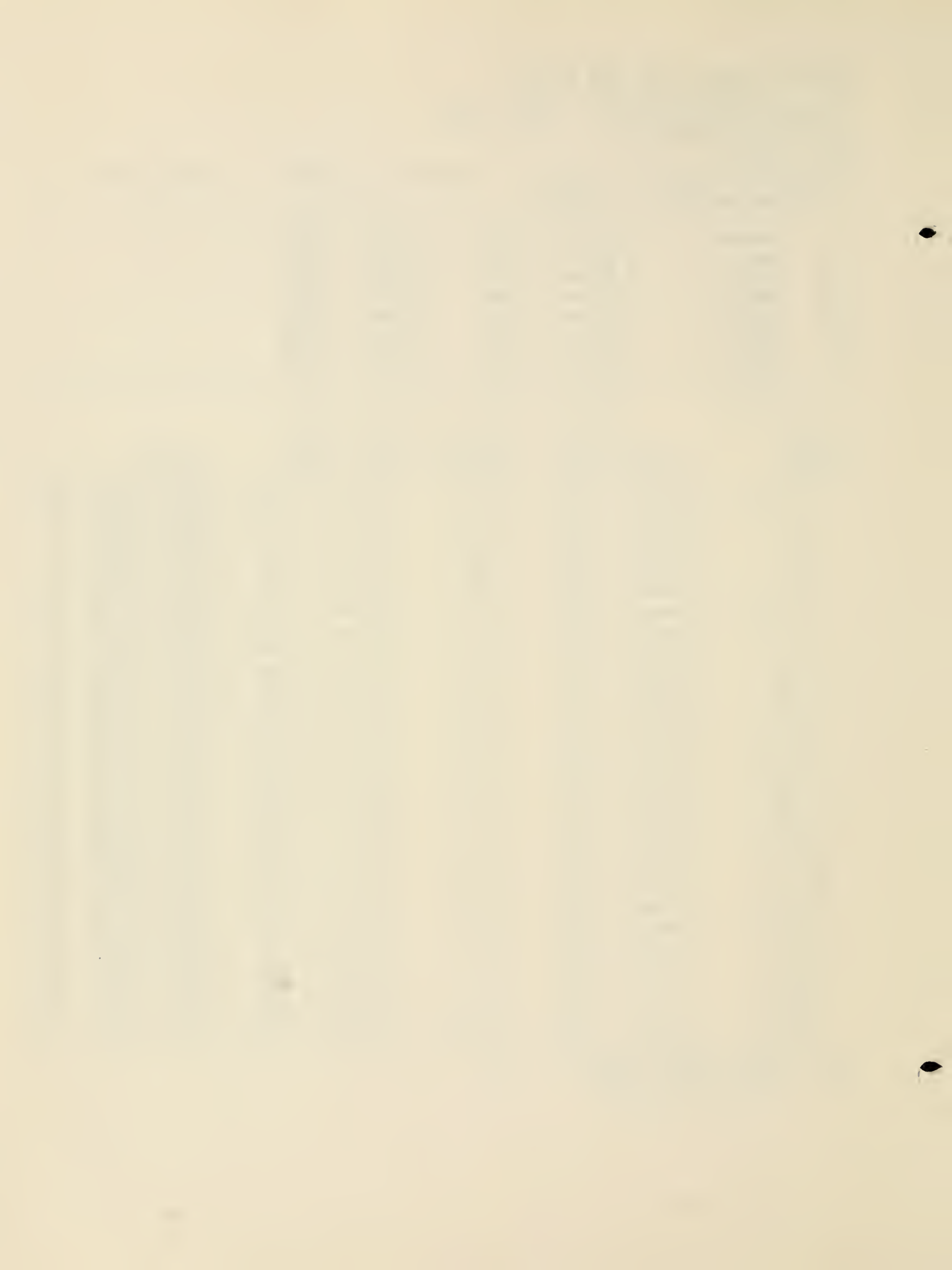
EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 4.027 D OF F: 6
CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.143+-	0.068	1.793+-	0.898	
5	GEO-C	*	1.689+-	0.152	21.181+-	3.866	
64	ZHBLD	*	0.565+-	0.147	7.082+-	2.155	
65	DRBLD	*	0.076+-	0.046	0.957+-	0.601	
67	BLFUP	*	0.112+-	0.050	1.409+-	0.662	
74	CUKST	*	0.041+-	0.022	0.510+-	0.283	
77	SECSO	*	1.687+-	0.241	21.168+-	4.517	
TOTAL:			4.313+-	0.335	54.100+-	9.562	

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.180+-	0.030	2.253	0.205+-	0.020	1.139+-0.165 AL
2 SI *	0.487+-	0.086	6.108	0.616+-	0.060	1.265+-0.197 SI
3 P	0.033+-	0.003	0.415	0.007+-	0.001	0.226+-0.016 P
4 S *	0.465+-	0.040	5.828	0.465+-	0.041	1.000+-0.125 S
5 CL	0.010+-	0.003	0.120	0.019+-	0.002	2.021+-0.507 CL
6 K *	0.149+-	0.022	1.869	0.045+-	0.004	0.303+-0.029 K
7 CA *	0.184+-	0.040	2.311	0.155+-	0.015	0.840+-0.107 CA
8 TI *	0.006+-	0.001	0.082	0.006+-	0.001	0.979+-0.129 TI
9 V	0.001+-	0.000	0.013	0.000+-	0.000	0.442+-0.076 V
10 CR	0.000+-	0.000	0.006	0.000+-	0.000	0.797+-0.138 CR
11 MH	0.002+-	0.001	0.026	0.002+-	0.000	0.944+-0.125 MH
12 FE *	0.068+-	0.011	0.353	0.064+-	0.006	0.939+-0.122 FE
13 HI	0.001+-	0.000	0.009	0.001+-	0.000	0.933+-0.122 HI
14 CU *	0.024+-	0.011	0.304	0.024+-	0.002	1.005+-0.129 CU
15 ZN *	0.121+-	0.031	1.514	0.141+-	0.013	1.169+-0.165 ZN
16 AS *	0.053+-	0.026	0.670	0.053+-	0.004	0.997+-0.118 AS
17 SE	0.000+-	0.000	0.006	0.000+-	0.000	0.636+-0.104 SE
18 BR *	0.009+-	0.002	0.117	0.010+-	0.004	1.060+-0.583 BR
19 SR	0.000+-	0.000	0.001	0.001+-	0.000	3.033+-1.399 SR
20 PD	0.003+-	0.001	0.038	0.004+-	0.000	1.353+-0.193 PD
21 AG	0.002+-	0.001	0.024	0.001+-	0.000	0.712+-0.204 AG
22 CD *	0.019+-	0.008	0.235	0.021+-	0.002	1.147+-0.156 CD
23 IN	0.002+-	0.002	0.011	0.000+-	0.001	0.053+-0.309 IN
24 SN	0.002+-	0.002	0.011	0.004+-	0.001	2.353+-0.952 SN
25 SB	<	0.001	---	0.007+-	0.001	0.000+-0.000 SB
26 BA	<	0.001	---	0.003+-	0.003	0.000+-0.000 BA
27 HG	0.001+-	0.001	0.013	0.001+-	0.000	0.537+-0.089 HG
28 PB *	0.184+-	0.078	2.308	0.140+-	0.009	0.759+-0.061 PB

MEAS. AMB. MASS (UG/M3): 8.0

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF1 30

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 2.445 D OF F: 6

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.115+- 0.049	1.292+- 0.660
5	GEO-C	*	1.763+- 0.187	19.767+- 5.919
64	ZNB LD	*	0.372+- 0.083	4.166+- 1.489
65	DRBLD	*	0.047+- 0.011	0.527+- 0.195
67	BLFUP	*	0.116+- 0.042	1.298+- 0.594
74	CUKST	*	0.011+- 0.004	0.118+- 0.055
77	SECSO	*	1.786+- 0.322	20.025+- 6.669

TOTAL: 4.210+- 0.387 47.192+-13.913

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
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1	AL *	0.191+- 0.040	2.142	0.210+- 0.020	1.099+-0.159	AL
2	SI *	0.502+- 0.105	5.625	0.635+- 0.062	1.266+-0.200	SI
3	P	0.033+- 0.005	0.371	0.007+- 0.001	0.219+-0.017	P
4	S *	0.481+- 0.064	5.395	0.481+- 0.044	1.000+-0.128	S
5	CL	0.011+- 0.005	0.120	0.016+- 0.002	1.464+-0.287	CL
6	K *	0.173+- 0.038	1.942	0.043+- 0.004	0.246+-0.022	K
7	CA *	0.221+- 0.067	2.483	0.160+- 0.016	0.723+-0.088	CA
8	TI *	0.007+- 0.001	0.077	0.007+- 0.001	0.943+-0.125	TI
9	V	0.000+- 0.000	0.002	0.000+- 0.000	1.118+-0.273	V
10	CR	0.000+- 0.000	0.002	0.000+- 0.000	1.280+-0.303	CR
11	MN	0.003+- 0.001	0.030	0.002+- 0.000	0.742+-0.089	MN
12	FE *	0.071+- 0.015	0.791	0.065+- 0.006	0.926+-0.121	FE
13	NI	0.001+- 0.000	0.007	0.000+- 0.000	0.773+-0.127	NI
14	CU *	0.007+- 0.002	0.083	0.007+- 0.001	1.000+-0.112	CU
15	ZN *	0.092+- 0.016	1.027	0.097+- 0.009	1.054+-0.135	ZN
16	AS *	0.035+- 0.006	0.388	0.035+- 0.003	1.001+-0.113	AS
17	SE	0.001+- 0.000	0.008	0.000+- 0.000	0.335+-0.065	SE
18	BR *	0.007+- 0.001	0.084	0.008+- 0.003	1.072+-0.586	BR
19	SR	0.000+- 0.000	0.002	0.001+- 0.000	1.470+-0.404	SR
20	PD	0.006+- 0.002	0.068	0.003+- 0.000	0.446+-0.051	PD
21	AG	0.002+- 0.002	0.010	0.001+- 0.000	0.515+-0.202	AG
22	CD *	0.017+- 0.008	0.191	0.021+- 0.002	1.247+-0.186	CD
23	IN	< 0.001	---	0.000+- 0.001	0.000+-0.000	IN
24	SN	< 0.001	---	0.003+- 0.001	0.000+-0.000	SN
25	SB	< 0.001	---	0.005+- 0.001	0.000+-0.000	SB
26	BA	< 0.001	---	0.003+- 0.003	0.000+-0.000	BA
27	HG	0.001+- 0.001	0.005	0.000+- 0.000	0.451+-0.095	HG
28	PB *	0.127+- 0.024	1.419	0.115+- 0.007	0.910+-0.078	PB

MEAS. AMB. MASS (UG/M3): 8.9

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # QF1.30

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

DICHOT-HOYOL CO-COLLECTED SAMPLES

SITE: CAHAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 3.621 D OF F: 6

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.150+- 0.072	1.865+- 0.953
5	GEO-C	*	1.512+- 0.142	18.830+- 3.756
64	ZHBLD	*	0.537+- 0.158	6.681+- 2.289
65	DRBLD	*	0.085+- 0.051	1.060+- 0.661
67	BLFUP	*	0.112+- 0.055	1.392+- 0.732
74	CUKST	*	0.042+- 0.024	0.518+- 0.313
77	SECSO	*	1.746+- 0.253	21.748+- 4.955

TOTAL: 4.183+- 0.347 52.094+-10.136

SPECIE		FINE		SUSPENDED PARTICULATE		RATIO	
CODE		MEAS.	UG/M3	PERCENT	CALC	UG/M3	
1	AL *	0.163+-	0.029	2.035	0.184+-	0.018	1.124+-0.161 AL
2	SI *	0.435+-	0.077	5.418	0.553+-	0.053	1.270+-0.198 SI
3	P	0.034+-	0.003	0.430	0.007+-	0.000	0.200+-0.014 P
4	S *	0.477+-	0.043	5.942	0.477+-	0.043	1.000+-0.126 S
5	CL	0.011+-	0.004	0.133	0.019+-	0.002	1.745+-0.393 CL
6	K *	0.148+-	0.025	1.838	0.041+-	0.004	0.281+-0.027 K
7	CA *	0.187+-	0.044	2.331	0.139+-	0.014	0.743+-0.090 CA
8	TI *	0.006+-	0.001	0.073	0.006+-	0.001	0.971+-0.127 TI
9	V	0.001+-	0.000	0.009	0.000+-	0.000	0.569+-0.104 V
10	CR	0.000+-	0.000	0.006	0.000+-	0.000	0.729+-0.121 CR
11	MH	0.002+-	0.001	0.024	0.002+-	0.000	0.951+-0.128 MH
12	FE *	0.063+-	0.010	0.778	0.058+-	0.005	0.920+-0.117 FE
13	HI	0.000+-	0.000	0.006	0.001+-	0.000	1.287+-0.189 HI
14	CU *	0.025+-	0.013	0.306	0.025+-	0.002	1.005+-0.130 CU
15	ZH *	0.115+-	0.034	1.427	0.135+-	0.012	1.176+-0.166 ZH
16	AS *	0.058+-	0.029	0.722	0.058+-	0.005	1.001+-0.121 AS
17	SE	0.001+-	0.000	0.007	0.000+-	0.000	0.534+-0.078 SE
18	BR *	0.010+-	0.003	0.120	0.010+-	0.004	1.070+-0.594 BR
19	SR	0.000+-	0.000	0.001	0.001+-	0.000	2.773+-1.167 SR
20	PD	0.003+-	0.001	0.042	0.004+-	0.000	1.228+-0.157 PD
21	AG	0.001+-	0.001	0.006	0.001+-	0.000	1.401+-0.495 AG
22	CD *	0.018+-	0.009	0.225	0.021+-	0.002	1.179+-0.162 CD
23	IN	0.002+-	0.002	0.012	0.000+-	0.000	0.048+-0.247 IN
24	SH	0.002+-	0.002	0.012	0.004+-	0.001	2.011+-0.678 SH
25	SB	<	0.001	---	0.007+-	0.001	0.000+-0.000 SB
26	BA	<	0.001	---	0.003+-	0.003	0.000+-0.000 BA
27	HG	0.001+-	0.001	0.014	0.001+-	0.000	0.498+-0.074 HG
28	PB *	0.195+-	0.086	2.426	0.138+-	0.009	0.708+-0.055 PB

MEAS. AMB. MASS (UG/M3): 8.0

* - FITTING ELEMENT

ER: E400

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CMBDEQ RESULTS FOR CMB # Q01 1

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.214 D OF F: 10

CODE SOURCE FLG UG/M3 %

12	GEO-J	*	10.891+- 0.775	65.981+-11.075
26	LIME	*	2.423+- 0.942	14.681+- 6.125
64	ZHBLD	*	1.005+- 0.314	6.086+- 2.118
67	BLFUP	*	0.069+- 0.065	0.419+- 0.402
74	CUKST	*	0.276+- 0.083	1.674+- 0.564

TOTAL:		14.665+- 1.264	88.841+-15.524
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SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	0.716+- 0.101	4.339	0.848+- 0.081	1.184+-0.175	AL	
2 SI *	2.663+- 0.404	16.132	2.866+- 0.276	1.076+-0.152	SI	
3 P	0.030+- 0.004	0.184	0.026+- 0.002	0.845+-0.107	P	
4 S	0.314+- 0.051	1.903	0.184+- 0.015	0.587+-0.055	S	
5 CL	0.043+- 0.007	0.258	0.032+- 0.002	0.746+-0.065	CL	
6 K *	0.227+- 0.032	1.375	0.207+- 0.019	0.912+-0.112	K	
7 CA *	1.422+- 0.246	8.618	1.487+- 0.105	1.045+-0.106	CA	
8 TI *	0.038+- 0.006	0.229	0.045+- 0.004	1.197+-0.179	TI	
9 Y	0.003+- 0.000	0.019	0.003+- 0.000	0.868+-0.136	Y	
10 CR	0.003+- 0.000	0.019	0.003+- 0.000	0.897+-0.110	CR	
11 MN *	0.016+- 0.002	0.095	0.016+- 0.001	1.032+-0.138	MN	
12 FE *	0.514+- 0.060	3.116	0.499+- 0.047	0.970+-0.128	FE	
13 HI *	0.004+- 0.001	0.023	0.003+- 0.000	0.677+-0.073	HI	
14 CU *	0.193+- 0.043	1.167	0.208+- 0.016	1.079+-0.122	CU	
15 ZN *	0.260+- 0.056	1.575	0.285+- 0.020	1.098+-0.117	ZN	
16 AS *	0.035+- 0.008	0.211	0.029+- 0.002	0.838+-0.088	AS	
17 SE	0.001+- 0.000	0.005	0.001+- 0.000	1.504+-0.497	SE	
18 BR *	0.005+- 0.001	0.030	0.004+- 0.000	0.820+-0.089	BR	
19 SR *	0.007+- 0.001	0.041	0.005+- 0.000	0.671+-0.068	SR	
20 PD	0.001+- 0.001	0.005	0.002+- 0.001	2.577+-1.960	PD	
21 AG	0.001+- 0.001	0.008	0.002+- 0.001	1.220+-1.114	AG	
22 CD *	0.017+- 0.005	0.105	0.017+- 0.002	0.984+-0.141	CD	
23 IN	0.002+- 0.001	0.013	0.000+- 0.002	0.146+-0.706	IN	
24 SN	0.008+- 0.003	0.048	0.007+- 0.002	0.934+-0.307	SN	
25 SB	0.008+- 0.004	0.047	0.011+- 0.003	1.357+-0.736	SB	
26 BA	0.009+- 0.009	0.026	0.009+- 0.008	0.991+-1.332	BA	
27 HG	0.001+- 0.000	0.005	0.001+- 0.000	0.701+-0.448	HG	
28 PB *	0.272+- 0.061	1.650	0.321+- 0.023	1.178+-0.129	PB	

MEAS. AMB. MASS (UG/M3): 16.5

* - FITTING ELEMENT

CM8DEQ RESULTS FOR CM8 # 001 10

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.238 D OF F: 10

CODE SOURCE FLG UG/M3

12	GED-J	*	10.567+- 0.817	67.534+-13.369
26	LIME	*	2.235+- 0.925	14.285+- 6.459
64	ZNBLD	*	1.192+- 0.356	7.618+- 2.663
67	BLFUP	*	0.088+- 0.073	0.560+- 0.476
74	CURST	*	0.287+- 0.095	1.831+- 0.690

TOTAL: 14.369+- 1.290 91.830+-18.654

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	0.690+- 0.106		4.412	0.824+- 0.078	1.194+-0.177	AL
2 SI *	2.533+- 0.441		16.188	2.783+- 0.267	1.099+-0.157	SI
3 P	0.031+- 0.005		0.196	0.025+- 0.002	0.822+-0.101	P
4 S	0.336+- 0.057		2.156	0.182+- 0.015	0.542+-0.050	S
5 CL	0.041+- 0.007		0.260	0.031+- 0.002	0.765+-0.067	CL
6 K *	0.216+- 0.034		1.380	0.204+- 0.018	0.945+-0.117	K
7 CA *	1.353+- 0.241		8.650	1.410+- 0.099	1.042+-0.106	CA
8 TI *	0.036+- 0.007		0.228	0.044+- 0.004	1.233+-0.187	TI
9 V	0.003+- 0.000		0.019	0.003+- 0.000	0.904+-0.143	V
10 CR	0.003+- 0.000		0.020	0.003+- 0.000	0.908+-0.111	CR
11 MN *	0.015+- 0.002		0.099	0.016+- 0.001	1.012+-0.133	MN
12 FE *	0.504+- 0.067		3.220	0.486+- 0.046	0.966+-0.127	FE
13 NI *	0.004+- 0.001		0.025	0.003+- 0.000	0.675+-0.070	NI
14 CU *	0.198+- 0.049		1.268	0.212+- 0.016	1.070+-0.121	CU
15 ZN *	0.280+- 0.063		1.789	0.320+- 0.023	1.142+-0.127	ZN
16 AS *	0.038+- 0.009		0.242	0.030+- 0.002	0.787+-0.078	AS
17 SE	0.001+- 0.000		0.006	0.001+- 0.000	1.350+-0.400	SE
18 BR *	0.005+- 0.001		0.035	0.004+- 0.000	0.738+-0.074	BR
19 SR *	0.007+- 0.001		0.044	0.004+- 0.000	0.649+-0.065	SR
20 PD	0.001+- 0.001		0.006	0.002+- 0.001	2.534+-1.683	PD
21 AG	0.002+- 0.001		0.011	0.002+- 0.001	1.042+-0.815	AG
22 CD *	0.018+- 0.005		0.118	0.018+- 0.002	0.997+-0.133	CD
23 IH	0.001+- 0.001		0.003	0.000+- 0.001	0.384+-1.597	IH
24 SN	0.009+- 0.004		0.060	0.008+- 0.002	0.860+-0.246	SN
25 SB	0.007+- 0.004		0.048	0.011+- 0.003	1.419+-0.765	SB
26 BA	0.010+- 0.010		0.032	0.008+- 0.008	0.832+-1.026	BA
27 HG	0.001+- 0.000		0.006	0.001+- 0.000	0.655+-0.385	HG
28 PB *	0.297+- 0.068		1.899	0.337+- 0.023	1.135+-0.117	PB

MEAS. AMB. MASS (UG/M3): 15.6

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # 001 2

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.212 D OF F: 9
CODE SOURCE FLG UG/M3 %

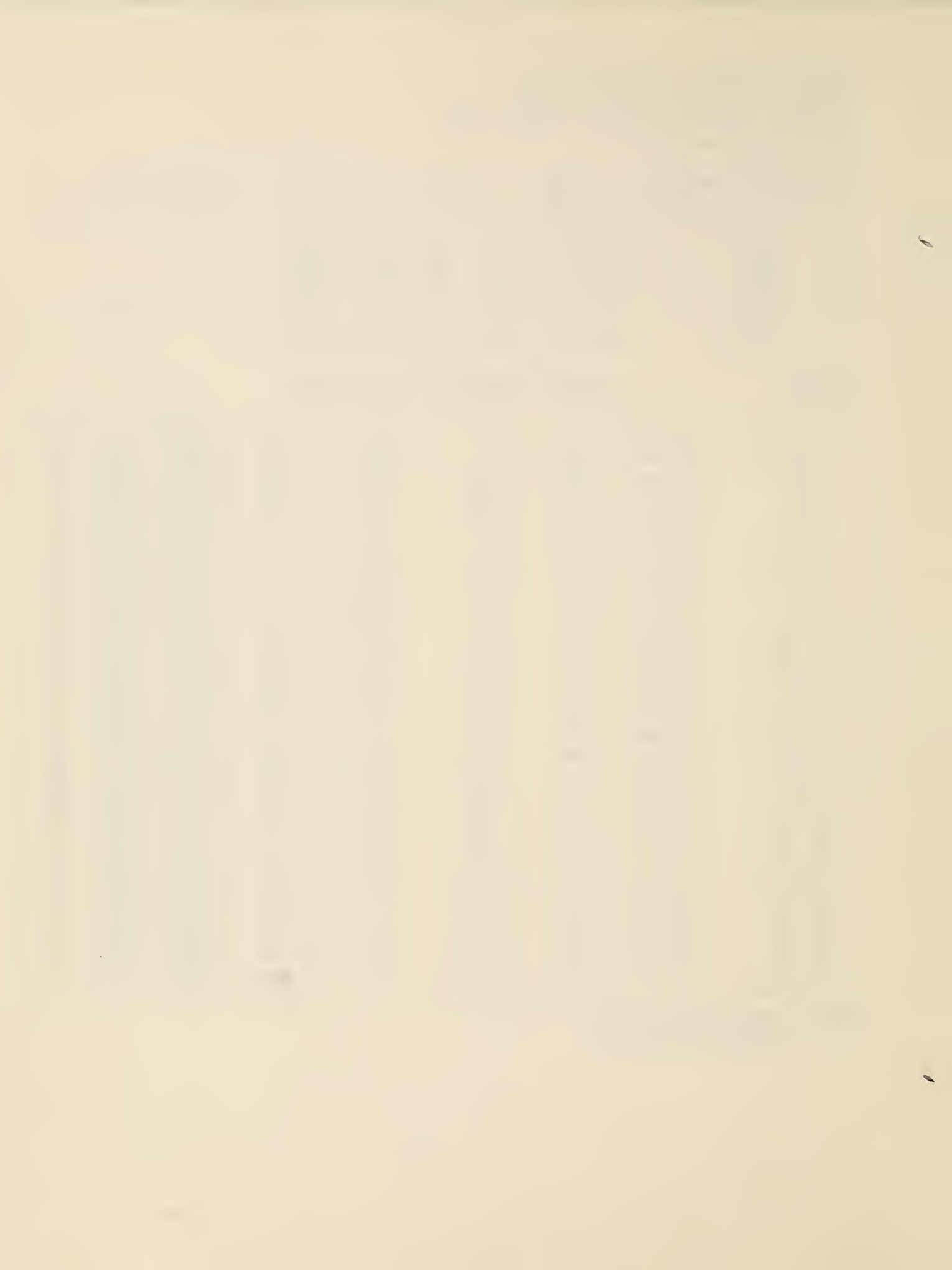
6	GED-D	*	2.703+-	1.892	23	531+-	18.326
12	GED-J	*	6.679+-	1.260	58	136+-	22.682
64	ZNBLO	*	0.426+-	0.143	3	711+-	1.777
74	CUKST	*	0.098+-	0.042		0.854+-	0.468

TOTAL: 9.906+- 2.278 86.233+-35.503

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC	UG/M3	RATIO	
1 AL *	0.738+-	0.291	6.421	0.766+-	0.056	1.039+-	0.110 AL
2 SI *	2.841+-	1.252	24.730	2.671+-	0.195	0.940+-	0.094 SI
3 P	0.028+-	0.007	0.248	0.022+-	0.002	0.778+-	0.072 P
4 S	0.156+-	0.019	1.355	0.104+-	0.009	0.669+-	0.069 S
5 CL	0.016+-	0.004	0.138	0.013+-	0.001	0.826+-	0.097 CL
6 K *	0.169+-	0.070	1.471	0.174+-	0.013	1.031+-	0.108 K
7 CA *	0.466+-	0.083	4.056	0.490+-	0.047	1.051+-	0.145 CA
8 TI *	0.042+-	0.017	0.363	0.042+-	0.003	1.005+-	0.104 TI
9 V	0.003+-	0.001	0.030	0.002+-	0.000	0.701+-	0.075 V
10 CR	0.002+-	0.001	0.017	0.002+-	0.000	1.193+-	0.140 CR
11 MN *	0.013+-	0.003	0.113	0.012+-	0.001	0.915+-	0.099 MN
12 FE *	0.418+-	0.126	3.640	0.428+-	0.032	1.023+-	0.109 FE
13 NI	0.002+-	0.000	0.016	0.001+-	0.000	0.790+-	0.098 NI
14 CU *	0.092+-	0.021	0.802	0.092+-	0.006	1.001+-	0.097 CU
15 ZN *	0.143+-	0.022	1.249	0.140+-	0.010	0.973+-	0.093 ZN
16 AS *	0.022+-	0.004	0.195	0.019+-	0.001	0.828+-	0.084 AS
17 SE	0.000+-	0.000	0.003	0.001+-	0.000	2.473+-	1.214 SE
18 BR *	0.003+-	0.000	0.023	0.003+-	0.000	0.993+-	0.111 BR
19 SR	0.003+-	0.001	0.027	0.003+-	0.000	0.915+-	0.105 SR
20 PD	0.001+-	0.000	0.005	0.001+-	0.000	1.934+-	1.288 PD
21 AG	0.003+-	0.001	0.024	0.001+-	0.001	0.331+-	0.234 AG
22 CD *	0.009+-	0.003	0.078	0.007+-	0.001	0.823+-	0.149 CD
23 IN	0.004+-	0.002	0.037	0.000+-	0.001	0.030+-	0.232 IN
24 SN	0.005+-	0.002	0.047	0.004+-	0.001	0.706+-	0.255 SN
25 SB	0.005+-	0.003	0.044	0.006+-	0.002	1.199+-	0.657 SB
26 BA	0.012+-	0.007	0.106	0.007+-	0.005	0.580+-	0.491 BA
27 HG	0.002+-	0.000	0.014	0.000+-	0.000	0.307+-	0.136 HG
28 PB *	0.163+-	0.029	1.418	0.190+-	0.014	1.167+-	0.128 PB

MEAS. AMB. MASS (UG/M3): 11.5

* - FITTING ELEMENT



CMDBED RESULTS FOR CMB # AC1 20
 COARSE PARTICULATE FRACTION
 SAMPLING DATE: QTR 2 SITE CODE: 1
 CO-COLLECTED SAMPLES
 SITE: CANAL

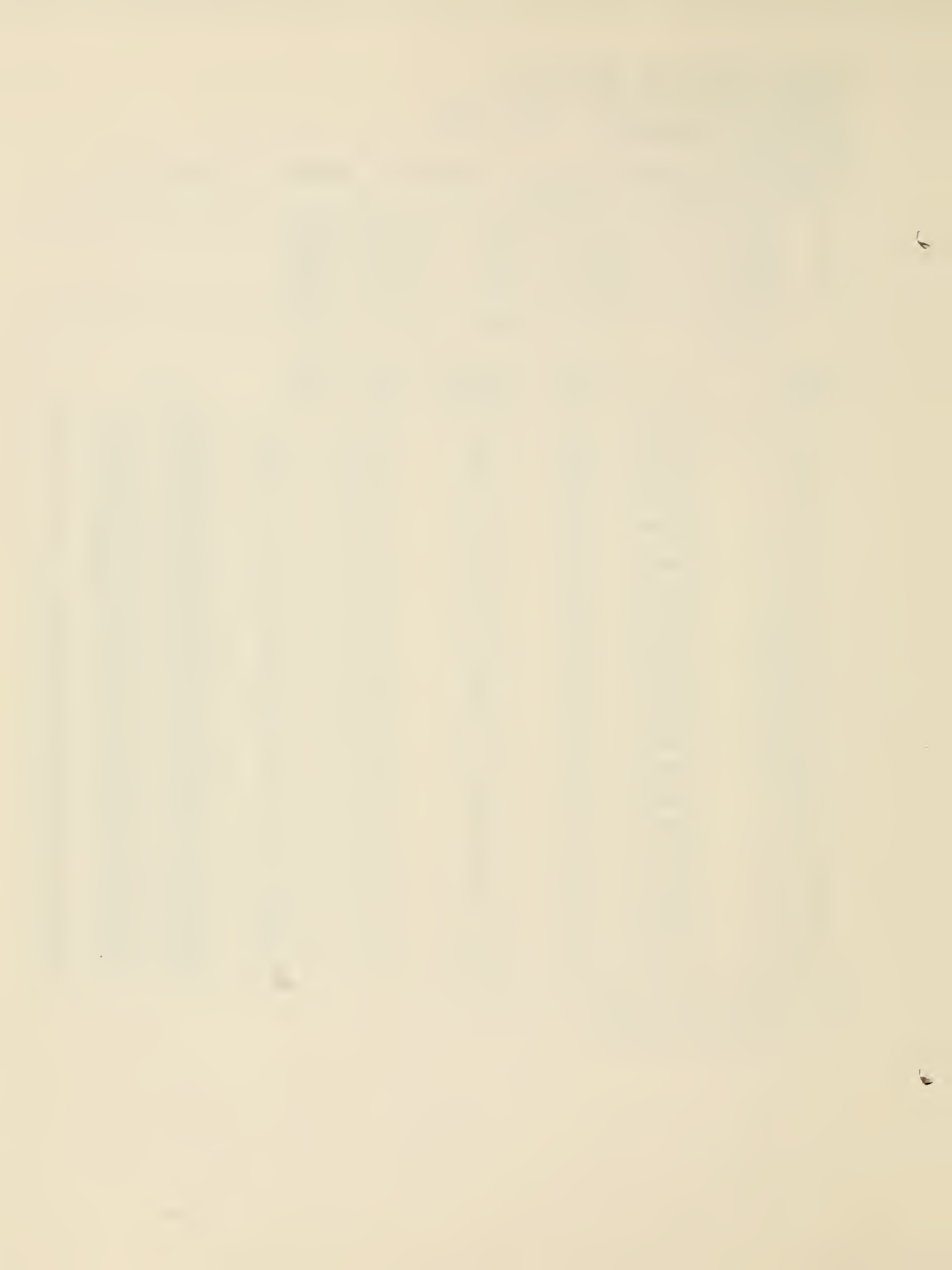
EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.313 0 OF F: 9
 CODE SOURCE FLG UG/M3 %

6	GEO-D	*	3.770+-	3.247	14.933+-	29.867
12	GEO-J	*	5.637+-	1.874	43.561+-	28.223
64	ZHBLD	*	0.215+-	0.176	1.661+-	1.641
74	CUKST	*	0.096+-	0.070	0.740+-	0.682

TOTAL: 9.717+- 3.753 75.092+-50.847

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO			
1 AL *	0.889+-	0.531	6.872	0.791+-	0.056	0.890+-	0.084	AL
2 SI *	3.527+-	2.287	27.256	2.784+-	0.196	0.729+-	0.071	SI
3 P	0.030+-	0.014	0.229	0.022+-	0.002	0.759+-	0.067	P
4 S	0.148+-	0.031	1.145	0.093+-	0.008	0.630+-	0.061	S
5 CL	0.014+-	0.007	0.111	0.013+-	0.001	0.869+-	0.097	CL
6 K *	0.214+-	0.128	1.654	0.174+-	0.012	0.813+-	0.073	K
7 CA *	0.518+-	0.148	4.002	0.425+-	0.039	0.820+-	0.098	CA
8 TI *	0.048+-	0.031	0.371	0.044+-	0.003	0.908+-	0.086	TI
9 V	0.004+-	0.002	0.032	0.003+-	0.000	0.596+-	0.056	V
10 CR	0.002+-	0.001	0.012	0.002+-	0.000	1.390+-	0.170	CR
11 MN *	0.014+-	0.006	0.105	0.011+-	0.001	0.836+-	0.081	MN
12 FE *	0.455+-	0.230	3.519	0.432+-	0.031	0.949+-	0.093	FE
13 NI	0.001+-	0.000	0.011	0.001+-	0.000	0.875+-	0.115	NI
14 CU *	0.087+-	0.037	0.669	0.087+-	0.006	1.001+-	0.097	CU
15 ZN *	0.109+-	0.028	0.841	0.095+-	0.006	0.870+-	0.076	ZN
16 AS *	0.016+-	0.005	0.123	0.016+-	0.001	1.018+-	0.113	AS
17 SE	0.000+-	0.000	0.002	0.001+-	0.000	2.098+-	0.922	SE
18 BR *	0.002+-	0.001	0.019	0.002+-	0.000	0.940+-	0.101	BR
19 SR	0.003+-	0.001	0.026	0.003+-	0.000	0.755+-	0.078	SR
20 PD	0.001+-	0.001	0.003	0.001+-	0.000	1.489+-	0.959	PD
21 AG	0.001+-	0.001	0.004	0.001+-	0.001	0.797+-	0.790	AG
22 CD *	0.006+-	0.003	0.050	0.006+-	0.001	0.991+-	0.197	CD
23 IH	0.004+-	0.002	0.035	0.004+-	0.001	0.014+-	0.194	IH
24 SH	0.007+-	0.003	0.051	0.003+-	0.001	0.412+-	0.166	SH
25 SB	0.003+-	0.003	0.015	0.005+-	0.002	1.455+-	0.996	SB
26 BA	0.017+-	0.012	0.130	0.007+-	0.005	0.416+-	0.303	BA
27 HG	0.001+-	0.001	0.010	0.000+-	0.000	0.373+-	0.152	HG
28 PB *	0.114+-	0.033	0.881	0.160+-	0.011	1.407+-	0.173	PB

MEAS. AMB. MASS (UG/M3): 12.9
 * - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # 901.2D

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

DICHOT-HIYOL CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.364 D OF F: 9

CODE SOURCE FLG UG/M3 %

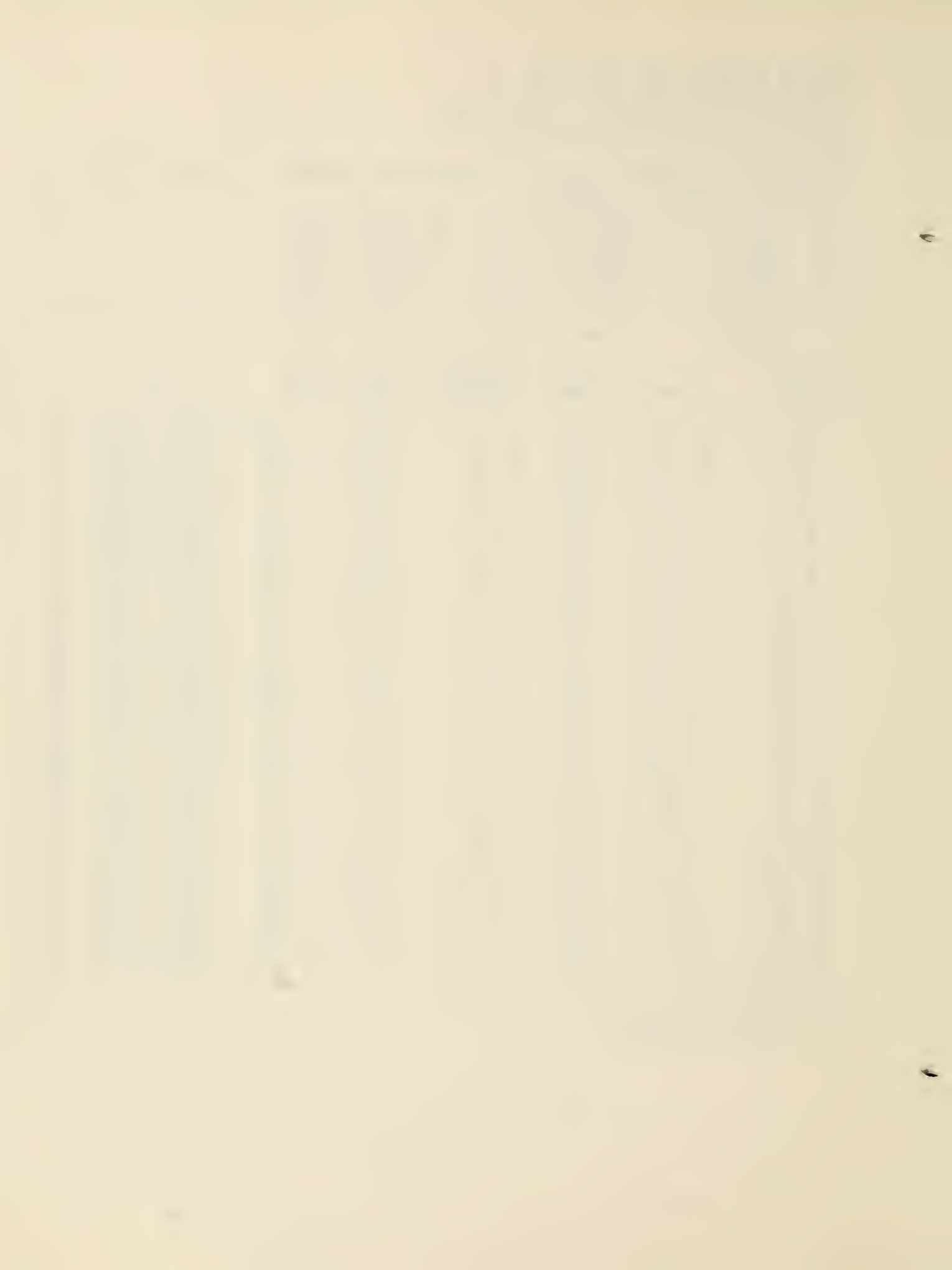
6	GEO-D	*	2.881+-	2.070	24.587+-	19.897
12	GEO-J	*	6.398+-	1.332	54.604+-	23.307
64	ZNBLO	*	0.323+-	0.138	2.754+-	1.564
74	CUKST	*	0.085+-	0.044	0.724+-	0.464

TOTAL: 9.686+- 2.466 82.669+-37.303

SPECIE		COARSE		SUSPENDED		PARTICULATE	
CODE		MEAS. UG/M3	PERCENT	CALC. UG/M3		RATIO	
1	AL *	0.767+- 0.324	6.548	0.762+- 0.055	0.993+-0.101	AL	
2	SI *	2.960+- 1.392	25.262	2.661+- 0.192	0.899+-0.087	SI	
3	P	0.029+- 0.008	0.252	0.022+- 0.002	0.742+-0.067	P	
4	S	0.147+- 0.020	1.253	0.100+- 0.009	0.682+-0.071	S	
5	CL	0.016+- 0.005	0.134	0.013+- 0.001	0.804+-0.093	CL	
6	K *	0.177+- 0.078	1.514	0.171+- 0.012	0.966+-0.097	K	
7	CA *	0.468+- 0.091	3.998	0.471+- 0.045	1.006+-0.135	CA	
8	TI *	0.043+- 0.019	0.370	0.042+- 0.003	0.963+-0.096	TI	
9	V	0.004+- 0.001	0.031	0.002+- 0.000	0.675+-0.071	V	
10	CR	0.002+- 0.001	0.015	0.002+- 0.000	1.308+-0.161	CR	
11	MN *	0.013+- 0.004	0.109	0.012+- 0.001	0.909+-0.097	MN	
12	FE *	0.419+- 0.140	3.573	0.423+- 0.031	1.010+-0.106	FE	
13	NI	0.002+- 0.000	0.014	0.001+- 0.000	0.824+-0.108	NI	
14	CU *	0.083+- 0.023	0.712	0.084+- 0.006	1.002+-0.096	CU	
15	ZN *	0.127+- 0.022	1.087	0.119+- 0.008	0.932+-0.086	ZN	
16	AS *	0.021+- 0.005	0.183	0.018+- 0.001	0.822+-0.084	AS	
17	SE	0.000+- 0.000	0.003	0.001+- 0.000	2.333+-1.111	SE	
18	BR *	0.002+- 0.000	0.021	0.002+- 0.000	0.978+-0.110	BR	
19	SR	0.003+- 0.000	0.026	0.003+- 0.000	0.912+-0.104	SR	
20	PD	0.001+- 0.000	0.006	0.001+- 0.000	1.462+-0.866	PD	
21	AG	0.002+- 0.001	0.017	0.001+- 0.001	0.425+-0.327	AG	
22	CD *	0.010+- 0.003	0.082	0.007+- 0.001	0.733+-0.129	CD	
23	IN	0.005+- 0.002	0.040	0.000+- 0.001	0.021+-0.200	IN	
24	SN	0.004+- 0.002	0.035	0.003+- 0.001	0.817+-0.342	SN	
25	SB	0.004+- 0.003	0.034	0.006+- 0.002	1.432+-0.906	SB	
26	BA	0.010+- 0.007	0.087	0.007+- 0.005	0.682+-0.595	BA	
27	HG	0.001+- 0.000	0.013	0.000+- 0.000	0.317+-0.140	HG	
28	PB *	0.139+- 0.025	1.190	0.177+- 0.013	1.269+-0.148	PB	

MEAS. AMB. MASS (UG/M3): 11.7

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QC1.3

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.550 D OF F: 6
CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.029+-	0.015	0.168+-	0.092
5	GEO-C	*	16.652+-	1.626	95.677+-	19.387
26	LIME	*	2.339+-	1.104	13.439+-	6.779
64	ZHBLD	*	0.487+-	0.121	2.797+-	0.855
65	DRBLD	*	0.066+-	0.030	0.382+-	0.187
74	CUKST	*	0.119+-	0.046	0.681+-	0.288

TOTAL: 19.692+- 1.970 113.143+-23.058

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 AL *	1.168+- 0.228	6.713	1.299+- 0.127	1.112+-0.162 AL
2 SI	4.128+- 0.792	23.715	4.690+- 0.460	1.136+-0.169 SI
3 P	0.036+- 0.006	0.207	0.030+- 0.003	0.832+-0.108 P
4 S	0.181+- 0.022	1.041	0.071+- 0.005	0.389+-0.031 S
5 CL	0.036+- 0.008	0.206	0.035+- 0.002	0.980+-0.097 CL
6 K *	0.300+- 0.050	1.722	0.290+- 0.028	0.967+-0.130 K
7 CA *	1.517+- 0.288	8.718	1.583+- 0.112	1.043+-0.107 CA
8 TI *	0.059+- 0.011	0.337	0.067+- 0.007	1.142+-0.169 TI
9 V	0.003+- 0.001	0.020	0.003+- 0.000	0.985+-0.134 V
10 CR	0.004+- 0.001	0.022	0.004+- 0.000	0.962+-0.128 CR
11 MN *	0.018+- 0.004	0.106	0.016+- 0.002	0.889+-0.112 MN
12 FE *	0.594+- 0.109	3.412	0.591+- 0.057	0.995+-0.136 FE
13 NI	0.001+- 0.000	0.009	0.001+- 0.000	0.805+-0.146 NI
14 CU *	0.070+- 0.024	0.400	0.070+- 0.006	1.002+-0.131 CU
15 ZN *	0.096+- 0.022	0.553	0.102+- 0.009	1.056+-0.135 ZN
16 AS *	0.019+- 0.006	0.107	0.019+- 0.001	1.028+-0.111 AS
17 SE	0.000+- 0.000	0.002	0.000+- 0.000	0.805+-0.541 SE
18 BR *	0.003+- 0.001	0.017	0.003+- 0.001	1.006+-0.368 BR
19 SR *	0.005+- 0.001	0.031	0.004+- 0.000	0.691+-0.072 SR
20 PD	0.001+- 0.001	0.002	0.001+- 0.001	1.570+-1.591 PD
21 AG	0.001+- 0.001	0.003	0.000+- 0.001	0.466+-0.830 AG
22 CD	0.001+- 0.001	0.004	0.003+- 0.001	2.710+-2.865 CD
23 IH	0.002+- 0.002	0.005	0.001+- 0.001	0.356+-0.737 IH
24 SN	0.005+- 0.003	0.028	0.004+- 0.001	0.755+-0.359 SN
25 SB	0.006+- 0.004	0.034	0.005+- 0.002	0.913+-0.545 SB
26 BA	< 0.001	---	0.007+- 0.006	0.000+-0.000 BA
27 HG	< 0.001	---	0.001+- 0.000	0.000+-0.000 HG
28 PB *	0.098+- 0.022	0.566	0.090+- 0.006	0.910+-0.082 PB

MEAS. AMB. MASS (UG/M3): 17.4

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QC1 30

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.374 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.027+-	0.017	0.166+-	0.117
5	GEO-C	*	15.430+-	1.877	95.797+-	30.145
26	LIME	*	2.704+-	1.355	16.789+-	9.723
64	ZNBLD	*	0.275+-	0.064	1.709+-	0.637
65	DRBLD	*	0.046+-	0.020	0.287+-	0.147
74	CUKST	*	0.055+-	0.033	0.341+-	0.228

TOTAL: 18.537+- 2.317 115.089+-36.365

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	1.128+-	0.304	7.005	1.208+-	0.117	1.071+-0.152 AL
2 SI *	3.979+-	1.023	24.706	4.359+-	0.426	1.095+-0.159 SI
3 P	0.037+-	0.012	0.228	0.027+-	0.003	0.746+-0.095 P
4 S	0.172+-	0.040	1.068	0.065+-	0.005	0.380+-0.030 S
5 CL	0.049+-	0.005	0.304	0.034+-	0.002	0.686+-0.059 CL
6 K *	0.304+-	0.077	1.891	0.267+-	0.026	0.876+-0.113 K
7 CA *	1.569+-	0.363	9.742	1.625+-	0.115	1.035+-0.105 CA
8 TI *	0.055+-	0.014	0.340	0.062+-	0.006	1.137+-0.168 TI
9 V	0.003+-	0.002	0.020	0.003+-	0.000	0.998+-0.137 V
10 CR	0.003+-	0.001	0.019	0.003+-	0.000	1.124+-0.163 CR
11 MN *	0.019+-	0.006	0.115	0.015+-	0.001	0.822+-0.100 MN
12 FE *	0.573+-	0.163	3.560	0.548+-	0.053	0.956+-0.128 FE
13 NI	0.001+-	0.001	0.007	0.001+-	0.000	0.772+-0.166 NI
14 CU *	0.034+-	0.018	0.212	0.034+-	0.003	1.000+-0.124 CU
15 ZN *	0.066+-	0.014	0.411	0.062+-	0.005	0.937+-0.106 ZN
16 AS *	0.014+-	0.004	0.089	0.014+-	0.001	0.964+-0.102 AS
17 SE	0.001+-	0.000	0.004	0.000+-	0.000	0.415+-0.283 SE
18 BR *	0.003+-	0.001	0.017	0.003+-	0.001	0.948+-0.351 BR
19 SR *	0.006+-	0.002	0.035	0.004+-	0.000	0.625+-0.063 SR
20 PD	0.001+-	0.001	0.004	0.001+-	0.000	0.442+-0.401 PD
21 AG	<	0.001	---	0.000+-	0.001	0.000+-0.000 AG
22 CD	0.002+-	0.002	0.008	0.003+-	0.001	1.090+-0.682 CD
23 IN	0.003+-	0.003	0.011	0.000+-	0.001	0.141+-0.327 IN
24 SH	0.004+-	0.004	0.012	0.002+-	0.001	0.673+-0.413 SH
25 SB	0.005+-	0.005	0.017	0.004+-	0.002	0.835+-0.544 SB
26 BA	<	0.001	---	0.006+-	0.006	0.000+-0.000 BA
27 HG	<	0.001	---	0.001+-	0.000	0.000+-0.000 HG
28 PB *	0.063+-	0.005	0.391	0.065+-	0.004	1.030+-0.095 PB

MEAS. AMB. MASS (UG/M3): 16.1

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QC1.3D

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

DICHOT-HIYOL CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.598 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.033+- 0.017	0.200+- 0.111
5	GEO-C	*	14.476+- 1.368	87.652+-19.415
26	LIME	*	2.885+- 1.193	17.471+- 8.025
64	ZHBLD	*	0.442+- 0.120	2.678+- 0.904
65	DRBLD	*	0.069+- 0.034	0.417+- 0.220
74	CUKST	*	0.116+- 0.050	0.703+- 0.336

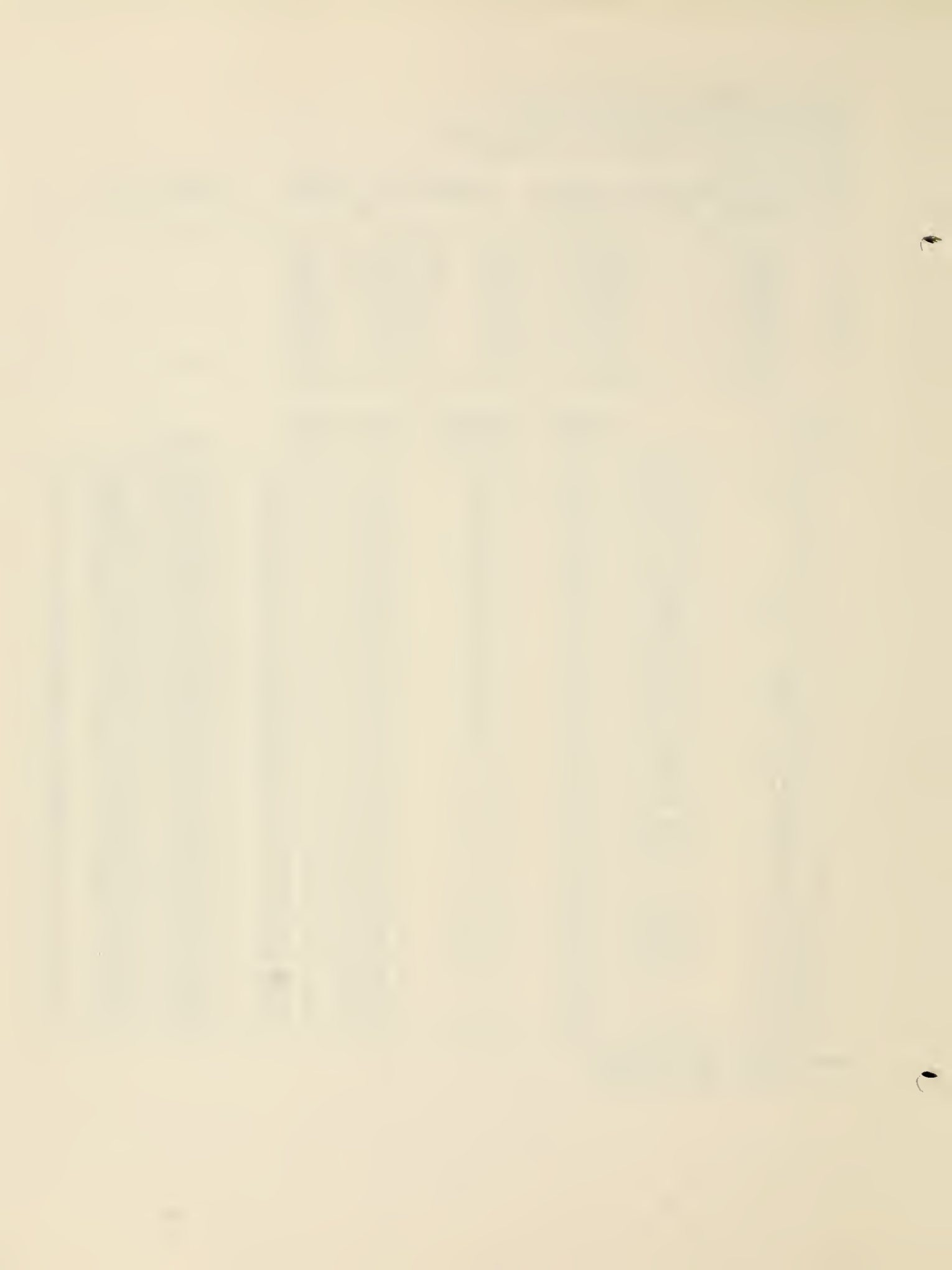
TOTAL: 18.022+- 1.820 109.121+-24.481

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
-------------	-------------	--------------------------------------	-------------	-------

1 AL *	1.033+- 0.205	6.257	1.140+- 0.110	1.103+-0.159	AL
2 SI *	3.659+- 0.713	22.157	4.107+- 0.400	1.122+-0.164	SI
3 P	0.034+- 0.007	0.206	0.026+- 0.003	0.765+-0.099	P
4 S	0.180+- 0.024	1.090	0.068+- 0.005	0.377+-0.028	S
5 CL	0.035+- 0.009	0.212	0.034+- 0.002	0.981+-0.093	CL
6 K *	0.284+- 0.053	1.718	0.253+- 0.024	0.893+-0.115	K
7 CA *	1.542+- 0.320	9.339	1.630+- 0.115	1.057+-0.109	CA
8 TI *	0.051+- 0.010	0.312	0.059+- 0.006	1.141+-0.168	TI
9 V	0.002+- 0.001	0.015	0.003+- 0.000	1.211+-0.183	V
10 CR	0.003+- 0.001	0.021	0.003+- 0.000	0.944+-0.124	CR
11 MH *	0.017+- 0.004	0.102	0.015+- 0.001	0.861+-0.105	MH
12 FE *	0.538+- 0.105	3.256	0.519+- 0.050	0.965+-0.129	FE
13 NI	0.001+- 0.000	0.009	0.001+- 0.000	0.738+-0.125	NI
14 CU *	0.068+- 0.026	0.411	0.068+- 0.006	1.003+-0.131	CU
15 ZH *	0.085+- 0.022	0.517	0.092+- 0.008	1.078+-0.140	ZH
16 AS *	0.018+- 0.007	0.110	0.019+- 0.001	1.042+-0.116	AS
17 SE	0.000+- 0.000	0.002	0.000+- 0.000	0.979+-0.690	SE
18 BR *	0.003+- 0.001	0.019	0.003+- 0.001	1.021+-0.402	BR
19 SR *	0.005+- 0.001	0.031	0.003+- 0.000	0.668+-0.066	SR
20 PD	0.001+- 0.001	0.002	0.001+- 0.000	1.265+-1.056	PD
21 AG	< 0.001	---	0.000+- 0.001	0.000+-0.000	AG
22 CD	0.001+- 0.001	0.004	0.003+- 0.001	2.299+-2.026	CD
23 IN	0.002+- 0.002	0.006	0.001+- 0.001	0.291+-0.570	IN
24 SN	0.002+- 0.002	0.006	0.003+- 0.001	1.618+-1.101	SN
25 SB	0.007+- 0.004	0.040	0.005+- 0.002	0.748+-0.397	SB
26 BA	< 0.001	---	0.006+- 0.006	0.000+-0.000	BA
27 HG	< 0.001	---	0.001+- 0.000	0.000+-0.000	HG
28 PB *	0.096+- 0.025	0.583	0.083+- 0.006	0.863+-0.076	PB

MEAS. AMB. MASS (UG/M3): 16.5

* - FITTING ELEMENT



USER: E400

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SPOOLED: 06/22/82 13:42
STARTED: 06/22/82 13:44, ON: CE2P BY: Q

CMB0EQ RESULTS FOR CMB # QT1-1

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.263 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.230+-	0.114	0.664+-	0.337
12	GEO-J	*	19.753+-	1.573	56.949+-	7.627
26	LIME	*	6.046+-	2.279	17.432+-	6.833
64	ZNBLO	*	2.700+-	0.881	7.783+-	2.675
65	DRBLO	*	0.414+-	0.184	1.194+-	0.545
67	BLFUP	*	0.261+-	0.238	0.752+-	0.691
74	CUKST	*	0.443+-	0.161	1.277+-	0.485

TOTAL: 29.847+- 2.928 86.051+-12.535

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO		
1 AL *	1.184+-	0.175	3.414	1.199+-	0.111	1.012+-0.133	AL
2 SI *	4.144+-	0.618	11.946	4.188+-	0.394	1.011+-0.135	SI
3 P	0.083+-	0.008	0.239	0.031+-	0.003	0.379+-0.041	P
4 S	1.260+-	0.181	3.633	0.286+-	0.021	0.227+-0.017	S
5 CL	0.094+-	0.016	0.270	0.060+-	0.005	0.643+-0.058	CL
6 K *	0.515+-	0.090	1.486	0.289+-	0.024	0.562+-0.054	K
7 CA *	2.879+-	0.592	8.300	2.860+-	0.205	0.993+-0.101	CA
8 TI *	0.054+-	0.008	0.155	0.066+-	0.006	1.224+-0.180	TI
9 Y	0.004+-	0.000	0.012	0.004+-	0.000	1.010+-0.142	Y
10 CR	0.006+-	0.001	0.018	0.004+-	0.000	0.690+-0.078	CR
11 MN *	0.025+-	0.003	0.071	0.024+-	0.002	0.982+-0.120	MN
12 FE *	0.748+-	0.094	2.157	0.683+-	0.062	0.913+-0.111	FE
13 NI	0.004+-	0.001	0.011	0.005+-	0.000	1.377+-0.125	NI
14 CU *	0.360+-	0.083	1.038	0.360+-	0.026	1.002+-0.102	CU
15 ZN *	0.652+-	0.158	1.881	0.632+-	0.050	0.968+-0.108	ZN
16 AS *	0.155+-	0.041	0.447	0.151+-	0.013	0.974+-0.116	AS
17 SE	0.002+-	0.000	0.007	0.002+-	0.000	0.915+-0.124	SE
18 BR *	0.023+-	0.004	0.066	0.022+-	0.006	0.966+-0.366	BR
19 SR	0.010+-	0.001	0.028	0.007+-	0.001	0.773+-0.071	SR
20 PD	0.002+-	0.001	0.005	0.010+-	0.001	6.322+-3.907	PD
21 AG	0.009+-	0.002	0.027	0.006+-	0.001	0.616+-0.154	AG
22 CD *	0.059+-	0.027	0.170	0.044+-	0.003	0.750+-0.072	CD
23 IN	<	0.001	---	0.006+-	0.002	0.000+-0.000	IN
24 SH	0.011+-	0.005	0.031	0.021+-	0.002	1.962+-0.498	SH
25 SB	0.016+-	0.009	0.047	0.027+-	0.005	1.672+-0.561	SB
26 BA	0.020+-	0.012	0.058	0.002+-	0.010	0.084+-0.515	BA
27 HG	0.002+-	0.001	0.006	0.001+-	0.000	0.708+-0.257	HG
28 PB *	0.610+-	0.148	1.760	0.752+-	0.041	1.232+-0.107	PB

MEAS. AMB. MASS (UG/M3): 34.7

* - FITTING ELEMENT

CMSDER RESULTS FOR CMB # QT1 10

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CAHAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.086 D OF F: 7
CODE SOURCE FLG UG/M3

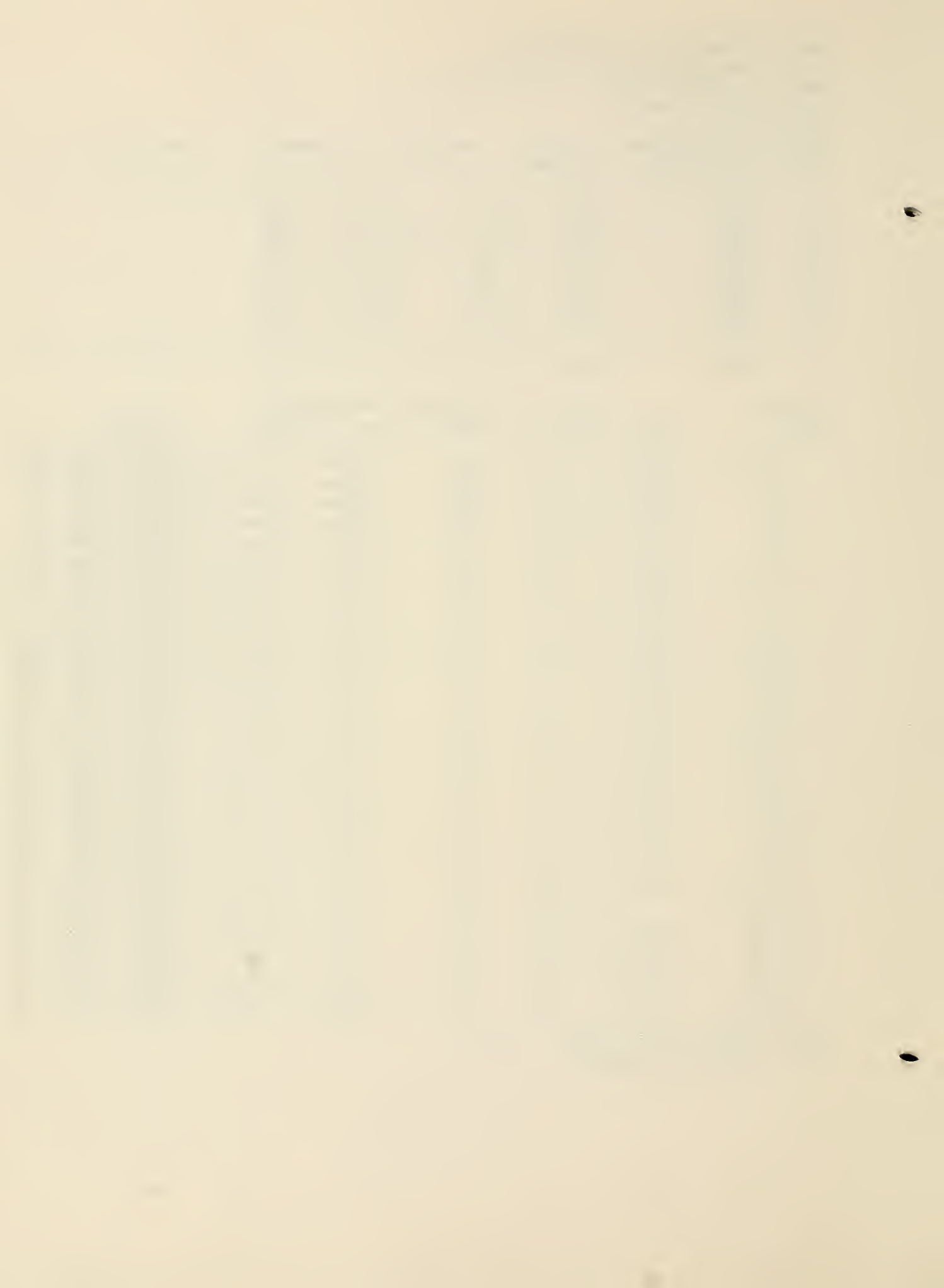
1	TRANS	*	0.296+-	0.147	0.774+-	0.396
12	GEO-J	*	21.133+-	1.669	55.371+-	7.828
26	LIME	*	6.890+-	2.836	18.053+-	7.725
64	ZNBLO	*	3.431+-	1.155	8.990+-	3.204
65	DRBLO	*	0.562+-	0.239	1.473+-	0.649
67	BLFUP	*	0.382+-	0.322	1.002+-	0.851
74	CUKST	*	0.519+-	0.215	1.359+-	0.584

TOTAL: 33.212+- 3.519 87.023+-13.754

SPECIE CODE	MEAS	TOTAL UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO		
1 AL *	1.262+-	0.175	3.308	1.293+-	0.118	1.024+-0.134	AL
2 SI *	4.412+-	0.636	11.559	4.508+-	0.422	1.022+-0.137	SI
3 P	0.089+-	0.010	0.235	0.035+-	0.003	0.390+-0.041	P
4 S	1.449+-	0.219	3.796	0.329+-	0.024	0.227+-0.017	S
5 CL	0.103+-	0.019	0.271	0.072+-	0.006	0.695+-0.068	CL
6 K *	0.511+-	0.093	1.339	0.319+-	0.026	0.625+-0.060	K
7 CA *	3.196+-	0.748	8.374	3.186+-	0.230	0.997+-0.102	CA
8 TI *	0.057+-	0.007	0.150	0.071+-	0.007	1.239+-0.181	TI
9 V	0.004+-	0.001	0.012	0.004+-	0.000	0.997+-0.138	V
10 CR	0.006+-	0.001	0.017	0.005+-	0.000	0.735+-0.083	CR
11 MN *	0.029+-	0.004	0.075	0.026+-	0.002	0.920+-0.107	MN
12 FE *	0.838+-	0.101	2.197	0.742+-	0.066	0.885+-0.105	FE
13 NI	0.005+-	0.001	0.013	0.006+-	0.000	1.243+-0.102	NI
14 CU *	0.415+-	0.112	1.087	0.415+-	0.030	1.001+-0.103	CU
15 ZN *	0.780+-	0.208	2.044	0.783+-	0.064	1.003+-0.116	ZN
16 AS *	0.200+-	0.053	0.523	0.196+-	0.017	0.980+-0.121	AS
17 SE	0.002+-	0.001	0.007	0.003+-	0.000	1.018+-0.133	SE
18 BR *	0.028+-	0.006	0.073	0.027+-	0.006	0.979+-0.386	BR
19 SR	0.011+-	0.002	0.030	0.008+-	0.001	0.718+-0.062	SR
20 PD	0.001+-	0.001	0.004	0.013+-	0.001	9.254+-7.547	PD
21 AG	0.010+-	0.003	0.027	0.007+-	0.001	0.682+-0.154	AG
22 CD *	0.077+-	0.037	0.203	0.060+-	0.005	0.779+-0.074	CD
23 IN	0.001	0.001	---	0.007+-	0.002	0.000+-0.000	IN
24 SN	0.014+-	0.007	0.036	0.026+-	0.003	1.930+-0.433	SN
25 SB	0.023+-	0.012	0.061	0.034+-	0.005	1.454+-0.399	SB
26 BA	0.013+-	0.009	0.033	0.002+-	0.011	0.182+-0.890	BA
27 HG	0.003+-	0.001	0.007	0.002+-	0.000	0.627+-0.194	HG
28 PB *	0.773+-	0.192	2.024	0.922+-	0.649	1.194+-0.099	PB

MEAS. AMB. MASS (UG/M3): 38.2

* - FITTING ELEMENT



CMB020 RESULTS FOR CMB # Q1: 2

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.131 D OF F: 7
CODE SOURCE FLG UG/M3

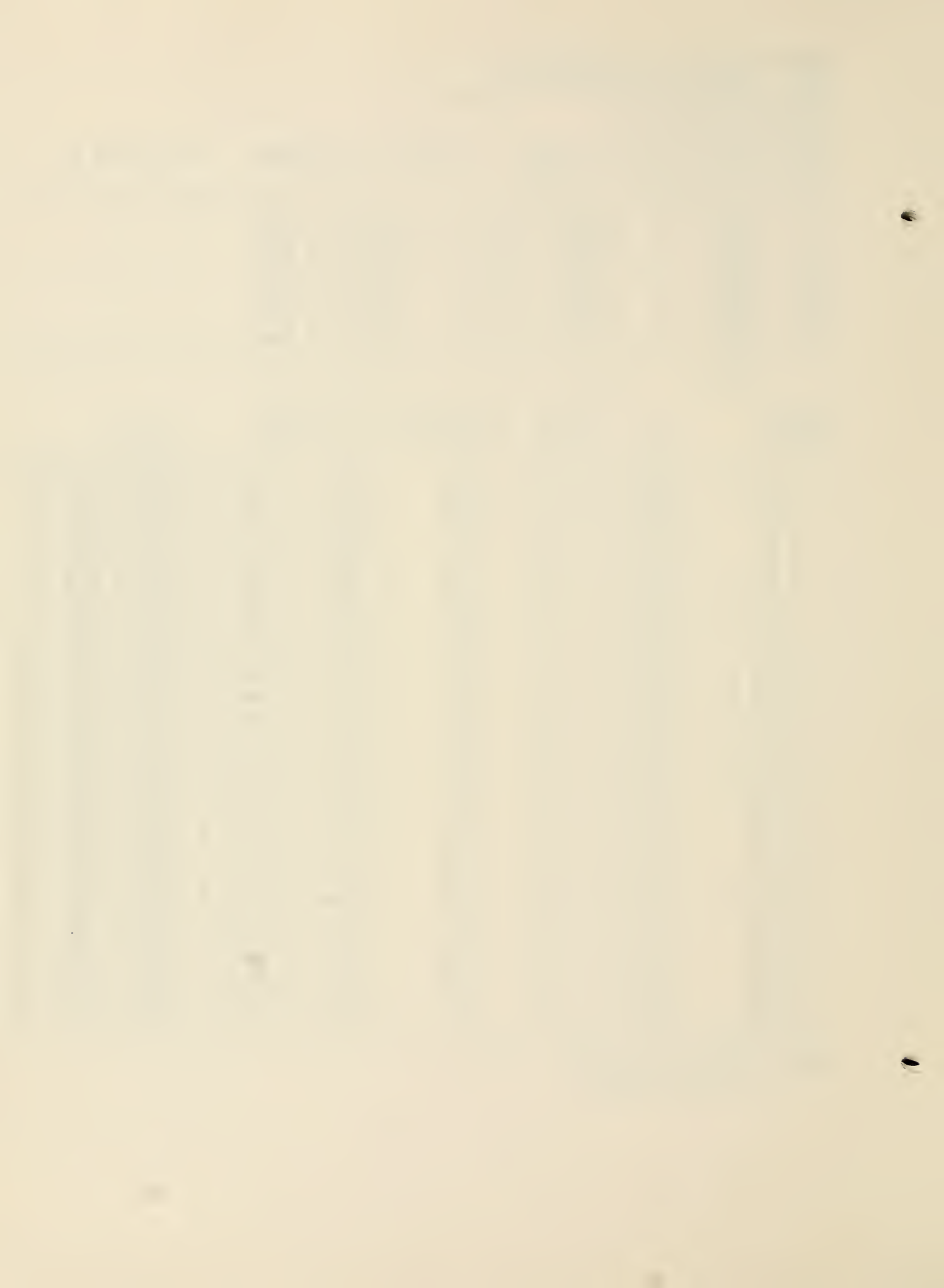
1	TRANS	*	0.120+-	0.061	0.357+-	0.200
6	GEO-D	*	5.298+-	3.777	15.752+-	11.866
12	GEO-J	*	19.310+-	4.093	57.404+-	18.541
64	ZNBLO	*	1.648+-	0.631	4.899+-	2.224
65	DRBLO	*	0.230+-	0.109	0.682+-	0.364
67	BLFUP	*	0.239+-	0.122	0.712+-	0.403
74	CUKST	*	0.182+-	0.108	0.540+-	0.346

TOTAL: 27.027+- 5.609 80.346+-25.718

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	1.636+-	0.587	4.865	1.596+-	0.119	0.975+-0.101 AL
2 SI *	6.344+-	2.517	18.859	5.654+-	0.432	0.923+-0.093 SI
3 P	0.066+-	0.013	0.196	0.041+-	0.003	0.620+-0.050 P
4 S	0.764+-	0.054	2.271	0.236+-	0.013	0.309+-0.025 S
5 CL	0.041+-	0.009	0.121	0.032+-	0.003	0.777+-0.107 CL
6 K *	0.365+-	0.112	1.086	0.359+-	0.025	0.983+-0.098 K
7 CA *	1.151+-	0.187	3.421	1.138+-	0.108	0.989+-0.132 CA
8 TI *	0.080+-	0.029	0.238	0.029+-	0.007	1.111+-0.123 TI
9 V	0.004+-	0.001	0.012	0.005+-	0.000	1.207+-0.156 V
10 CR	0.004+-	0.001	0.013	0.005+-	0.000	1.118+-0.137 CR
11 MN *	0.023+-	0.006	0.083	0.026+-	0.002	0.932+-0.103 MN
12 FE *	0.860+-	0.239	2.556	0.871+-	0.065	1.013+-0.107 FE
13 NI	0.004+-	0.001	0.012	0.004+-	0.000	1.001+-0.083 NI
14 CU *	0.219+-	0.055	0.653	0.220+-	0.014	1.000+-0.090 CU
15 ZN *	0.476+-	0.113	1.415	0.443+-	0.032	0.931+-0.092 ZN
16 AS *	0.104+-	0.024	0.310	0.103+-	0.008	0.989+-0.102 AS
17 SE	0.003+-	0.001	0.008	0.002+-	0.000	0.638+-0.087 SE
18 BR *	0.015+-	0.002	0.045	0.015+-	0.003	0.986+-0.296 BR
19 SR	0.007+-	0.001	0.020	0.007+-	0.001	0.978+-0.106 SR
20 PD	0.003+-	0.001	0.009	0.007+-	0.001	2.106+-0.635 PD
21 AG	0.013+-	0.002	0.038	0.004+-	0.001	0.330+-0.098 AG
22 CO *	0.041+-	0.012	0.122	0.038+-	0.003	0.917+-0.104 CO
23 IN	0.004+-	0.002	0.011	0.006+-	0.002	1.740+-0.959 IN
24 SH	0.004+-	0.002	0.012	0.016+-	0.002	3.855+-2.189 SH
25 SB	0.023+-	0.011	0.085	0.020+-	0.004	0.705+-0.188 SB
26 BA	0.040+-	0.015	0.120	0.001+-	0.010	0.029+-0.253 BA
27 HG	0.004+-	0.001	0.011	0.001+-	0.000	0.310+-0.113 HG
28 PB *	0.540+-	0.126	1.604	0.636+-	0.035	1.179+-0.100 PB

MEAS. AMB. MASS (UG/M3): 33.6

* - FITTING ELEMENT



CHBDEQ RESULTS FOR CHB # QT1 20

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.078 D OF F: 7

CODE SOURCE FLG UG/M3 N

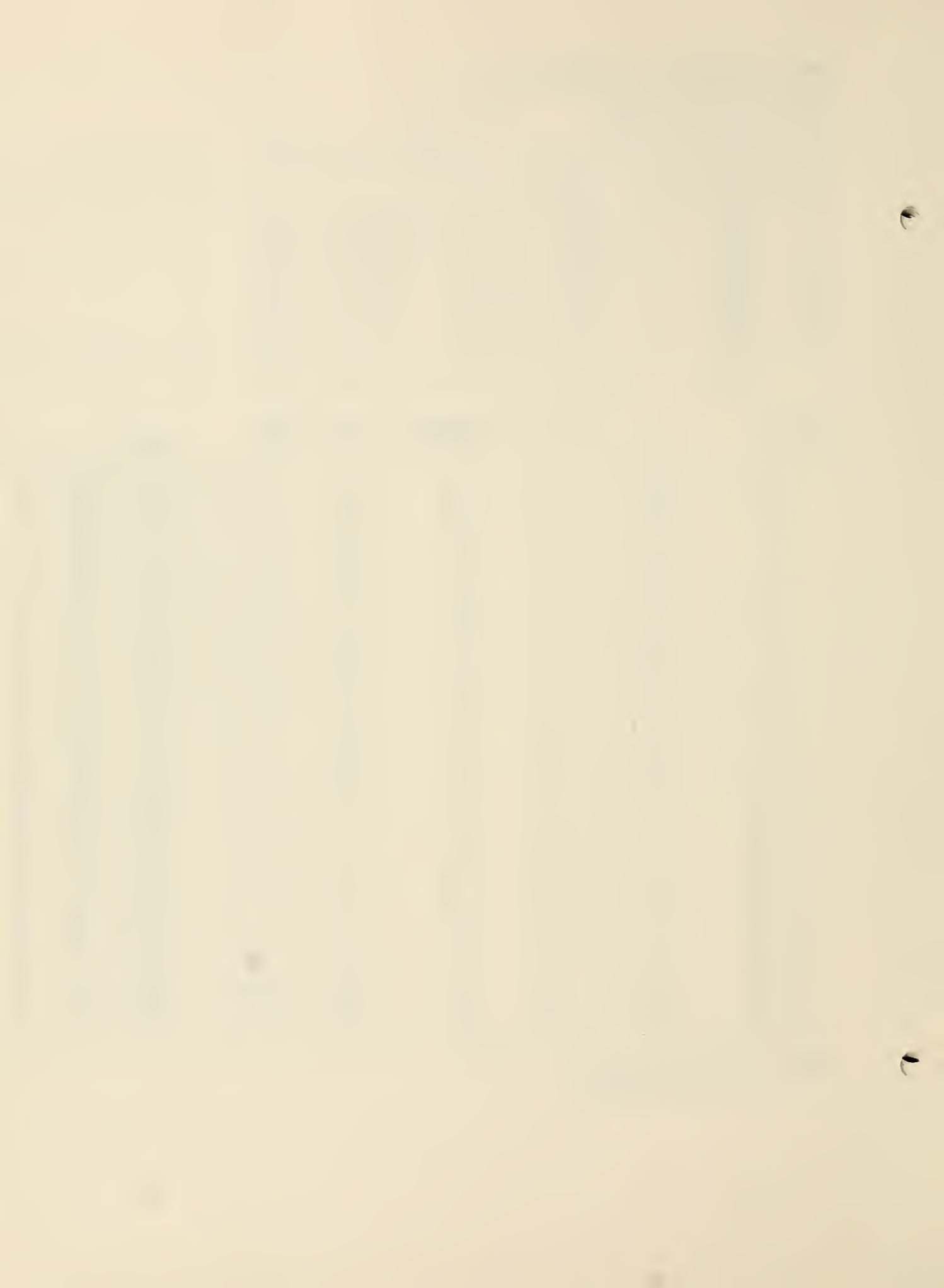
1	TRANS	*	0.089+-	0.068	0.224+-	0.187
6	GEO-D	*	11.203+-	5.760	28.048+-	17.373
12	GEO-J	*	18.522+-	5.626	46.371+-	21.329
64	ZNBLO	*	1.768+-	0.956	4.426+-	2.841
65	DRBLD	*	0.199+-	0.148	0.499+-	0.408
67	BLFUP	*	0.165+-	0.153	0.414+-	0.408
74	CUKST	*	0.146+-	0.146	0.194+-	0.387

TOTAL: 32.093+- 8.113 80.349+-34.390

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	2.150+-	0.992	5.384	2.108+-	0.148	0.980+-0.096 AL
2 SI *	8.515+-	4.274	21.318	7.878+-	0.554	0.925+-0.089 SI
3 P	0.078+-	0.023	0.196	0.052+-	0.003	0.670+-0.054 P
4 S	0.754+-	0.084	1.887	0.239+-	0.018	0.317+-0.025 S
5 CL	0.037+-	0.013	0.093	0.032+-	0.003	0.867+-0.107 CL
6 K *	0.463+-	0.190	1.160	0.457+-	0.030	0.987+-0.093 K
7 CA *	1.143+-	0.272	2.863	1.145+-	0.104	1.001+-0.129 CA
8 TI *	0.107+-	0.049	0.267	0.118+-	0.008	1.103+-0.115 TI
9 V	0.005+-	0.002	0.012	0.006+-	0.000	1.339+-0.165 V
10 CR	0.005+-	0.002	0.013	0.006+-	0.000	1.201+-0.137 CR
11 MN *	0.034+-	0.010	0.086	0.030+-	0.002	0.887+-0.085 MN
12 FE *	1.073+-	0.396	2.688	1.118+-	0.077	1.042+-0.104 FE
13 NI	0.004+-	0.001	0.010	0.004+-	0.000	1.080+-0.093 NI
14 CU *	0.208+-	0.075	0.521	0.208+-	0.012	1.000+-0.085 CU
15 ZH *	0.503+-	0.176	1.260	0.468+-	0.034	0.929+-0.092 ZH
16 AS *	0.098+-	0.033	0.245	0.097+-	0.007	0.990+-0.097 AS
17 SE	0.003+-	0.001	0.007	0.002+-	0.000	0.668+-0.098 SE
18 BR *	0.014+-	0.004	0.035	0.014+-	0.002	0.994+-0.243 BR
19 SR	0.007+-	0.002	0.019	0.008+-	0.001	1.006+-0.100 SR
20 PD	0.003+-	0.001	0.007	0.006+-	0.001	2.330+-0.782 PD
21 AG	0.016+-	0.003	0.040	0.004+-	0.001	0.252+-0.077 AG
22 CD *	0.032+-	0.015	0.080	0.030+-	0.003	0.925+-0.111 CD
23 IN	0.002+-	0.002	0.002	0.007+-	0.002	4.003+-4.125 IN
24 SH	0.001	0.001	---	0.016+-	0.002	0.000+-0.000 SH
25 SB	0.030+-	0.017	0.075	0.019+-	0.004	0.627+-0.174 SB
26 BA	0.028+-	0.019	0.070	0.001+-	0.010	0.035+-0.370 BA
27 HG	0.004+-	0.001	0.011	0.001+-	0.000	0.294+-0.092 HG
28 PB *	0.541+-	0.192	1.354	0.641+-	0.034	1.186+-0.099 PB

MEAS. AMB. MASS (UG/M3): 39.9

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT1 2T

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 1

LOVOL-HIYOL CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.166 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.116+- 0.063	0.356+- 0.216
6	GEO-D	*	5.259+- 4.100	16.073+-13.315
12	GEO-J	*	19.171+- 4.339	58.590+-21.095
64	ZMBLD	*	1.478+- 0.676	4.516+- 2.423
65	DRBLD	*	0.222+- 0.120	0.679+- 0.413
67	BLFUP	*	0.217+- 0.135	0.662+- 0.451
74	CUKST	*	0.138+- 0.110	0.422+- 0.357

TOTAL: 26.601+- 6.012 81.298+-29.254

SPECIE CODE	MEAS	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO
1 AL *	1.635+- 0.656	4.997	1.582+- 0.118	0.968+-0.100	AL
2 SI *	6.386+- 2.817	19.516	5.807+- 0.429	0.909+-0.091	SI
3 P	0.067+- 0.015	0.204	0.040+- 0.003	0.600+-0.048	P
4 S	0.750+- 0.059	2.294	0.228+- 0.018	0.304+-0.025	S
5 CL	0.038+- 0.010	0.117	0.030+- 0.003	0.775+-0.108	CL
6 K *	0.368+- 0.125	1.124	0.354+- 0.025	0.962+-0.095	K
7 CA *	1.154+- 0.201	3.526	1.129+- 0.107	0.978+-0.130	CA
8 TI *	0.080+- 0.033	0.245	0.088+- 0.007	1.100+-0.121	TI
9 V	0.004+- 0.001	0.013	0.005+- 0.000	1.195+-0.154	V
10 CR	0.004+- 0.001	0.013	0.005+- 0.000	1.155+-0.145	CR
11 MH *	0.027+- 0.007	0.084	0.026+- 0.002	0.943+-0.105	MH
12 FE *	0.836+- 0.265	2.556	0.862+- 0.064	1.031+-0.111	FE
13 NI	0.003+- 0.001	0.011	0.004+- 0.000	1.086+-0.097	NI
14 CU *	0.194+- 0.056	0.594	0.194+- 0.012	1.001+-0.089	CU
15 ZN *	0.452+- 0.122	1.380	0.410+- 0.029	0.907+-0.087	ZN
16 AS *	0.101+- 0.027	0.309	0.099+- 0.007	0.984+-0.102	AS
17 SE	0.002+- 0.001	0.008	0.002+- 0.000	0.888+-0.099	SE
18 BR *	0.015+- 0.003	0.045	0.014+- 0.003	0.983+-0.294	BR
19 SR	0.006+- 0.001	0.020	0.007+- 0.001	1.022+-0.114	SR
20 PD	0.003+- 0.001	0.011	0.006+- 0.001	1.768+-0.483	PD
21 AG	0.013+- 0.002	0.040	0.004+- 0.001	0.306+-0.093	AG
22 CD *	0.039+- 0.014	0.120	0.035+- 0.003	0.884+-0.100	CD
23 IN	0.001+- 0.001	0.002	0.006+- 0.002	5.270+-7.850	IN
24 SN	0.003+- 0.002	0.009	0.015+- 0.002	4.833+-3.537	SN
25 SB	0.027+- 0.012	0.082	0.020+- 0.004	0.729+-0.201	SB
26 BA	0.036+- 0.014	0.109	0.001+- 0.010	0.030+-0.294	BA
27 HG	0.004+- 0.001	0.012	0.001+- 0.000	0.290+-0.108	HG
28 PB *	0.486+- 0.135	1.486	0.607+- 0.034	1.248+-0.111	PB

MEAS. AMB. MASS (UG/M3): 32.7

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # QT1 3

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

ALL VALID SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.212 D OF F: 7

CODE SOURCE FLG UG/M3 %

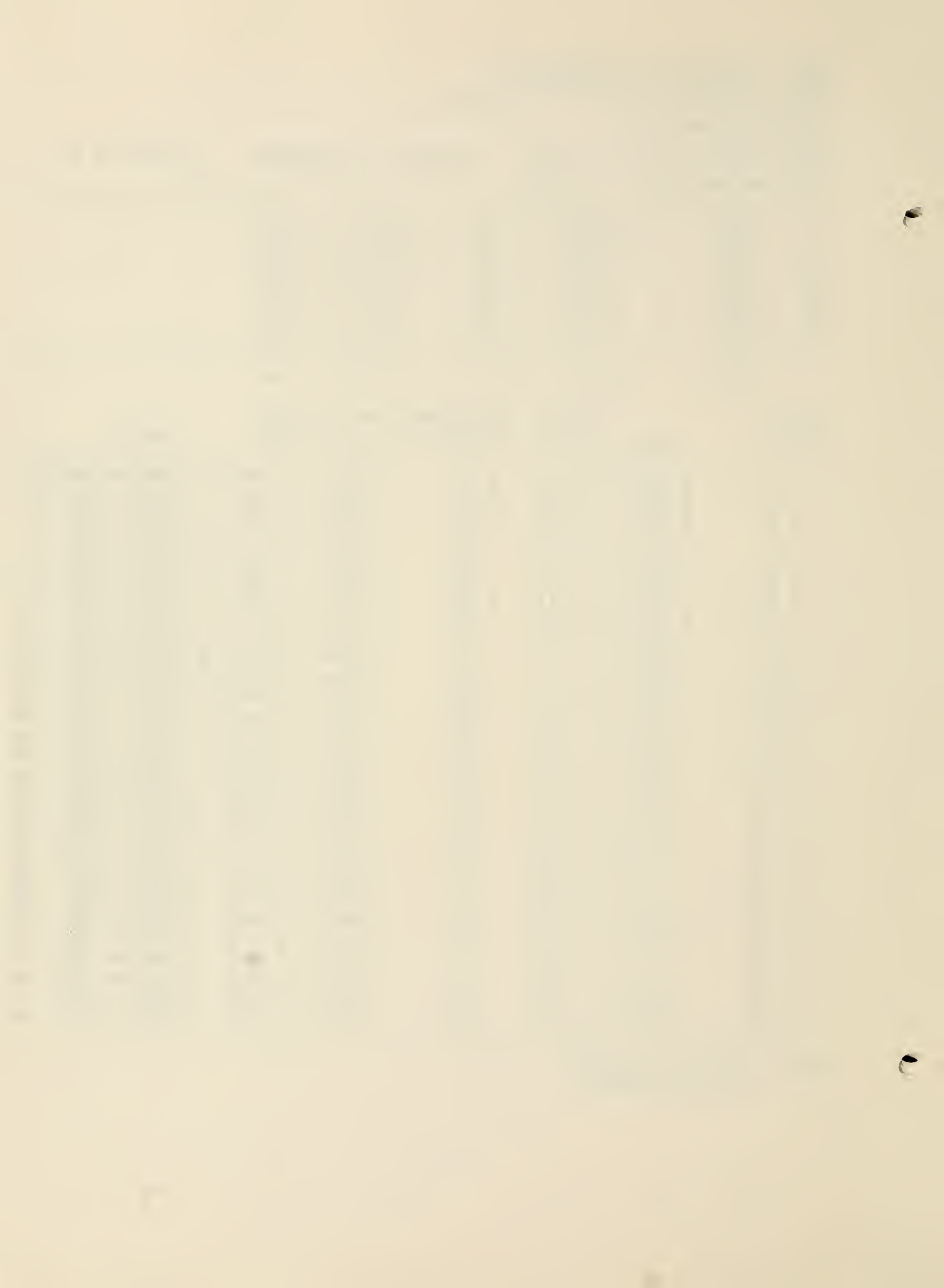
1	TRANS	*	0.132+-	0.058	0.304+-	0.138
5	GEO-C	*	26.999+-	1.499	61.957+-	8.271
26	LIME	*	4.664+-	1.768	10.704+-	4.261
64	ZHBLD	*	1.134+-	0.291	2.603+-	0.738
65	DRBLD	*	0.208+-	0.081	0.477+-	0.194
67	BLFUP	*	0.201+-	0.135	0.461+-	0.315
74	CUKST	*	0.181+-	0.052	0.416+-	0.130

TOTAL:			33.519+-	2.343	76.921+-	10.776
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	2.297+-	0.207	5.271	2.606+-	0.254	1.135+-0.168 AL
2 SI *	8.637+-	0.757	19.820	9.442+-	0.928	1.093+-0.159 SI
3 P	0.086+-	0.012	0.199	0.055+-	0.005	0.636+-0.074 P
4 S	0.711+-	0.077	1.632	0.164+-	0.011	0.230+-0.016 S
5 CL	0.071+-	0.012	0.163	0.070+-	0.005	0.982+-0.092 CL
6 K *	0.676+-	0.076	1.552	0.491+-	0.047	0.725+-0.085 K
7 CA *	2.853+-	0.445	6.547	2.865+-	0.202	1.004+-0.100 CA
8 TI *	0.111+-	0.009	0.255	0.112+-	0.011	1.012+-0.140 TI
9 V	0.005+-	0.001	0.013	0.006+-	0.001	1.182+-0.175 V
10 CR	0.007+-	0.001	0.016	0.005+-	0.000	0.772+-0.090 CR
11 MN *	0.032+-	0.004	0.073	0.028+-	0.003	0.868+-0.107 MN
12 FE *	1.107+-	0.097	2.539	1.016+-	0.098	0.919+-0.120 FE
13 NI	0.002+-	0.001	0.005	0.002+-	0.000	1.239+-0.224 NI
14 CU *	0.113+-	0.026	0.260	0.113+-	0.010	1.000+-0.123 CU
15 ZN *	0.242+-	0.045	0.556	0.241+-	0.021	0.996+-0.121 ZN
16 AS *	0.067+-	0.017	0.153	0.066+-	0.006	0.990+-0.134 AS
17 SE	0.000+-	0.000	0.001	0.001+-	0.000	2.216+-1.326 SE
18 BR *	0.012+-	0.001	0.028	0.012+-	0.003	0.988+-0.391 BR
19 SR	0.012+-	0.002	0.028	0.007+-	0.001	0.599+-0.057 SR
20 PD	0.006+-	0.003	0.014	0.004+-	0.001	0.699+-0.174 PD
21 AG	<	0.001	---	0.002+-	0.001	0.000+-0.000 AG
22 CD *	0.054+-	0.036	0.123	0.029+-	0.003	0.536+-0.056 CD
23 IN	0.011+-	0.006	0.024	0.001+-	0.002	0.083+-0.180 IN
24 SN	0.007+-	0.004	0.017	0.007+-	0.002	1.004+-0.380 SN
25 SB	<	0.001	---	0.014+-	0.004	0.000+-0.000 SB
26 BA	0.052+-	0.023	0.119	0.001+-	0.010	0.018+-0.199 BA
27 HG	0.002+-	0.001	0.004	0.002+-	0.000	0.899+-0.210 HG
28 PB *	0.282+-	0.046	0.648	0.296+-	0.015	1.049+-0.078 PB

MEAS. AMB. MASS (UG/M3): 43.6

* - FITTING ELEMENT



CMRDEQ RESULTS FOR CMB # QT1.3C

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.709 D OF F: 7

CODE SOURCE FLG UG/M3 %

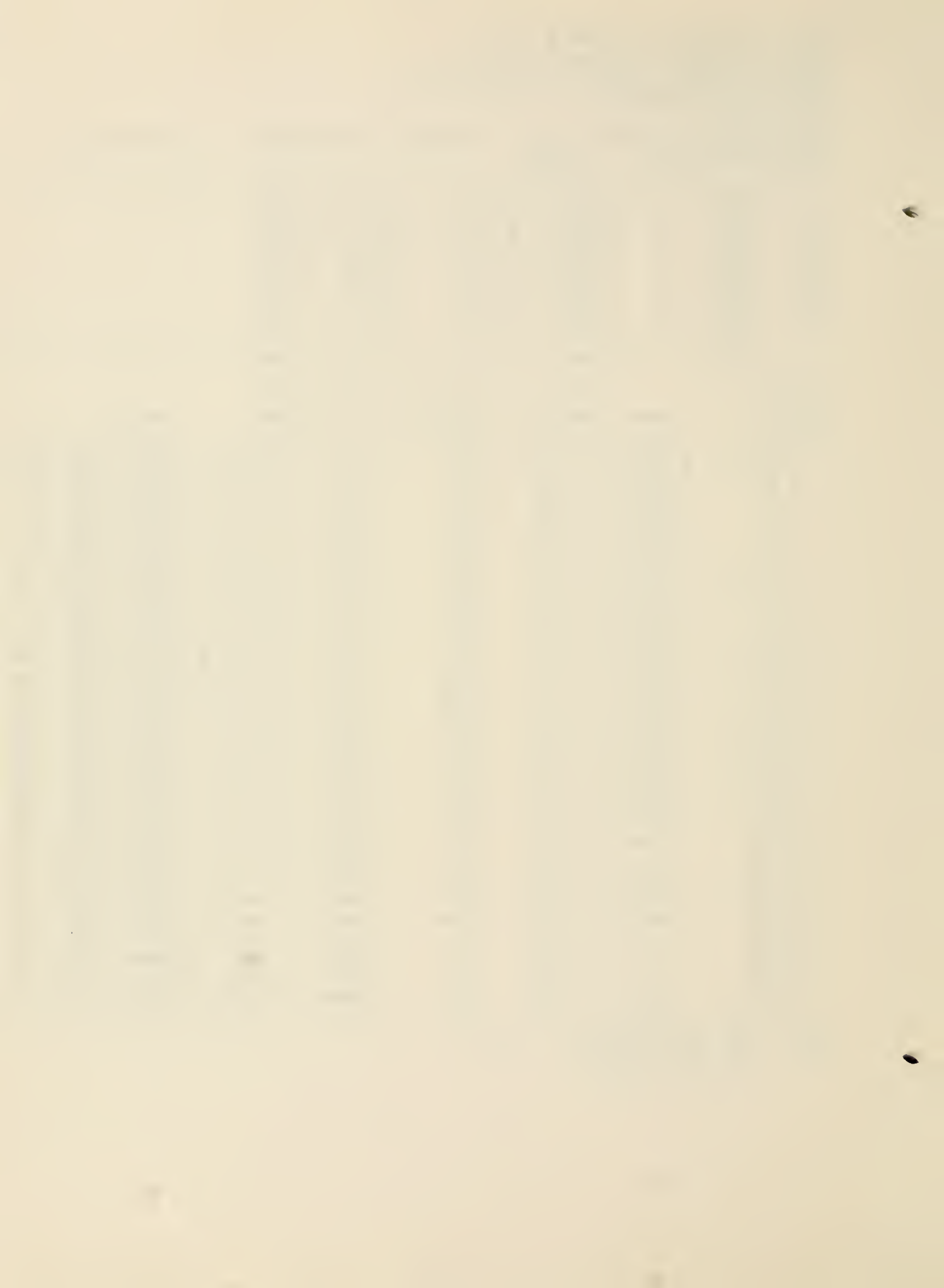
1	TRANS	*	0.133+-	0.058	0.270+-	0.130
5	GEO-C	*	30.213+-	2.401	61.427+-	13.262
26	LIME	*	7.295+-	2.903	14.831+-	6.610
64	ZNBLD	*	1.172+-	0.249	2.382+-	0.696
65	DRBLD	*	0.162+-	0.047	0.330+-	0.116
67	BLFUP	*	0.185+-	0.085	0.377+-	0.189
74	CUKST	*	0.207+-	0.087	0.421+-	0.196

TOTAL:	39.367+-	3.778	80.038+-	17.808
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO			
1 AL *	2.618+-	0.409	5.322	2.938+-	0.285	1.122+-	0.163	AL
2 SI *	9.782+-	1.526	19.828	10.621+-	1.038	1.086+-	0.157	SI
3 P	0.107+-	0.026	0.217	0.061+-	0.006	0.574+-	0.067	P
4 S	0.823+-	0.167	1.674	0.192+-	0.012	0.234+-	0.015	S
5 CL	0.094+-	0.025	0.191	0.085+-	0.006	0.904+-	0.079	CL
6 K *	0.813+-	0.155	1.653	0.549+-	0.052	0.675+-	0.078	K
7 CA *	3.776+-	0.757	7.676	3.799+-	0.269	1.006+-	0.101	CA
8 TI *	0.121+-	0.021	0.247	0.127+-	0.012	1.042+-	0.146	TI
9 Y	0.005+-	0.002	0.009	0.007+-	0.001	1.597+-	0.286	Y
10 CR	0.009+-	0.002	0.018	0.006+-	0.001	0.656+-	0.072	CR
11 MN *	0.039+-	0.007	0.078	0.031+-	0.003	0.811+-	0.096	MN
12 FE *	1.255+-	0.204	2.552	1.144+-	0.109	0.911+-	0.118	FE
13 NI	0.003+-	0.002	0.006	0.003+-	0.000	0.872+-	0.136	NI
14 CU *	0.127+-	0.046	0.258	0.127+-	0.011	1.000+-	0.125	CU
15 ZN *	0.242+-	0.040	0.492	0.249+-	0.021	1.029+-	0.127	ZN
16 AS *	0.055+-	0.009	0.113	0.056+-	0.005	1.004+-	0.130	AS
17 SE	0.000+-	0.000	0.001	0.001+-	0.000	2.255+-	1.501	SE
18 BR *	0.012+-	0.002	0.025	0.013+-	0.003	1.019+-	0.399	BR
19 SR	0.015+-	0.004	0.031	0.009+-	0.001	0.566+-	0.051	SR
20 PD	0.006+-	0.006	0.006	0.004+-	0.001	0.631+-	0.183	PD
21 AG	<	0.001	---	0.002+-	0.001	0.000+-	0.000	AG
22 CD *	0.024+-	0.012	0.049	0.027+-	0.003	1.138+-	0.167	CD
23 IN	0.007+-	0.007	0.007	0.001+-	0.002	0.109+-	0.298	IN
24 SH	0.005+-	0.005	0.006	0.007+-	0.002	1.267+-	0.653	SH
25 SB	<	0.001	---	0.013+-	0.004	0.000+-	0.000	SB
26 BA	0.031+-	0.031	0.032	0.001+-	0.012	0.028+-	0.373	BA
27 HG	<	0.001	---	0.002+-	0.000	0.000+-	0.000	HG
28 PB *	0.302+-	0.033	0.614	0.295+-	0.015	0.977+-	0.071	PB

MEAS. AMB. MASS (UG/M3): 49.2

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT1.3T

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 1

LOYOL-HIYOL CO-COLLECTED SAMPLES

SITE: CANAL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.162 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.138+-	0.061	0.316+-	0.146
5	GEO-C	*	26.322+-	1.523	60.456+-	8.774
26	LIME	*	4.463+-	1.858	10.249+-	4.481
64	ZNBLO	*	1.103+-	0.311	2.533+-	0.791
65	DRBLD	*	0.213+-	0.088	0.490+-	0.211
67	BLFUP	*	0.224+-	0.146	0.516+-	0.342
74	DUKST	*	0.193+-	0.055	0.444+-	0.140

TOTAL:	32.657+-	2.430	75.005+-	11.438
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO			
1 AL *	2.232+-	0.216	5.125	2.540+-	0.248	1.138+-	0.168	AL
2 SI *	8.431+-	0.798	19.364	9.203+-	0.905	1.092+-	0.159	SI
3 P	0.087+-	0.013	0.199	0.054+-	0.005	0.622+-	0.071	P
4 S	0.716+-	0.084	1.645	0.164+-	0.011	0.229+-	0.016	S
5 CL	0.069+-	0.013	0.159	0.069+-	0.005	0.998+-	0.095	CL
6 K *	0.668+-	0.083	1.533	0.479+-	0.046	0.717+-	0.084	K
7 CA *	2.755+-	0.476	6.328	2.769+-	0.195	1.005+-	0.101	CA
8 TI *	0.110+-	0.010	0.252	0.110+-	0.011	1.000+-	0.138	TI
9 V	0.005+-	0.001	0.012	0.006+-	0.001	1.218+-	0.184	V
10 CR	0.007+-	0.001	0.016	0.005+-	0.000	0.754+-	0.087	CR
11 MN *	0.031+-	0.004	0.072	0.027+-	0.003	0.862+-	0.106	MN
12 FE *	1.088+-	0.104	2.499	0.991+-	0.095	0.911+-	0.118	FE
13 NI	0.002+-	0.001	0.005	0.002+-	0.000	1.128+-	0.188	NI
14 CU *	0.120+-	0.028	0.276	0.120+-	0.011	1.000+-	0.124	CU
15 ZN *	0.238+-	0.049	0.546	0.237+-	0.020	0.996+-	0.120	ZN
16 AS *	0.069+-	0.019	0.158	0.068+-	0.007	0.989+-	0.134	AS
17 SE	0.000+-	0.000	0.001	0.001+-	0.000	2.781+-	1.966	SE
18 BR *	0.013+-	0.002	0.029	0.013+-	0.004	0.988+-	0.397	BR
19 SR	0.013+-	0.002	0.029	0.007+-	0.001	0.575+-	0.054	SR
20 PD	0.006+-	0.003	0.014	0.004+-	0.001	0.719+-	0.175	PD
21 AG	<	0.001	---	0.002+-	0.001	0.000+-	0.000	AG
22 CD *	0.058+-	0.039	0.134	0.031+-	0.003	0.532+-	0.054	CD
23 IN	0.012+-	0.006	0.027	0.001+-	0.002	0.077+-	0.160	IN
24 SH	0.008+-	0.004	0.018	0.007+-	0.002	0.922+-	0.325	SH
25 SB	<	0.001	---	0.014+-	0.004	0.000+-	0.000	SB
26 BA	0.057+-	0.025	0.130	0.001+-	0.010	0.018+-	0.178	BA
27 HG	0.002+-	0.001	0.004	0.002+-	0.000	0.940+-	0.222	HG
28 PB *	0.289+-	0.049	0.663	0.304+-	0.016	1.052+-	0.079	PB

MEAS. AMB. MASS (UG/M3): 43.5

* - FITTING ELEMENT



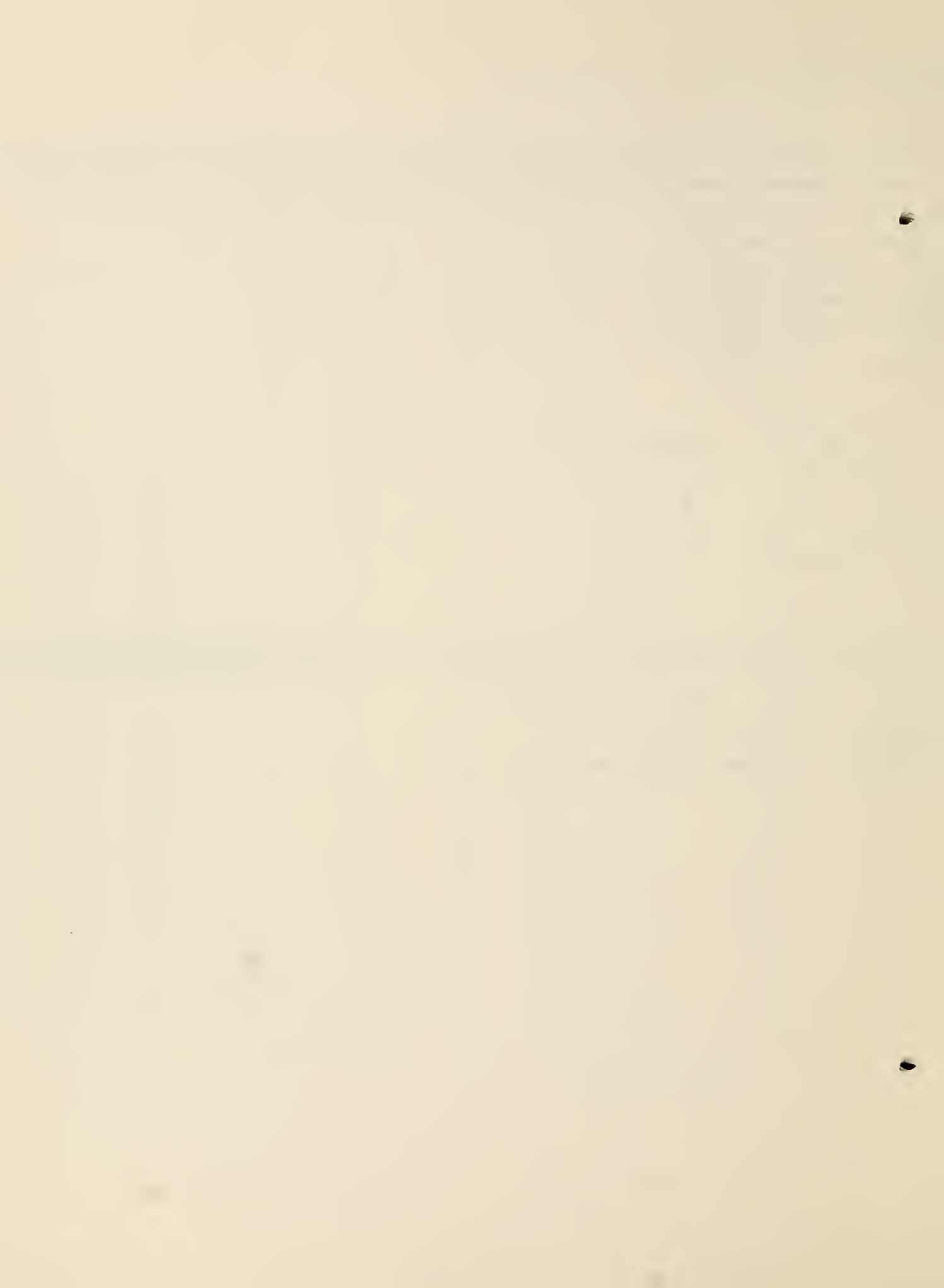
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REL: PRT002 -FORM -COPIES 1

DOLED: 06/22/82 13:50
RTED: 06/22/82 13:51. ON: CE2P BY: Q



CMDED RESULTS FOR CMB # QTR 4

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 2

ALL VALID SAMPLES

SITE: DARTMAN

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.380 D OF F: 8

CODE SOURCE FLG UG/M3 %

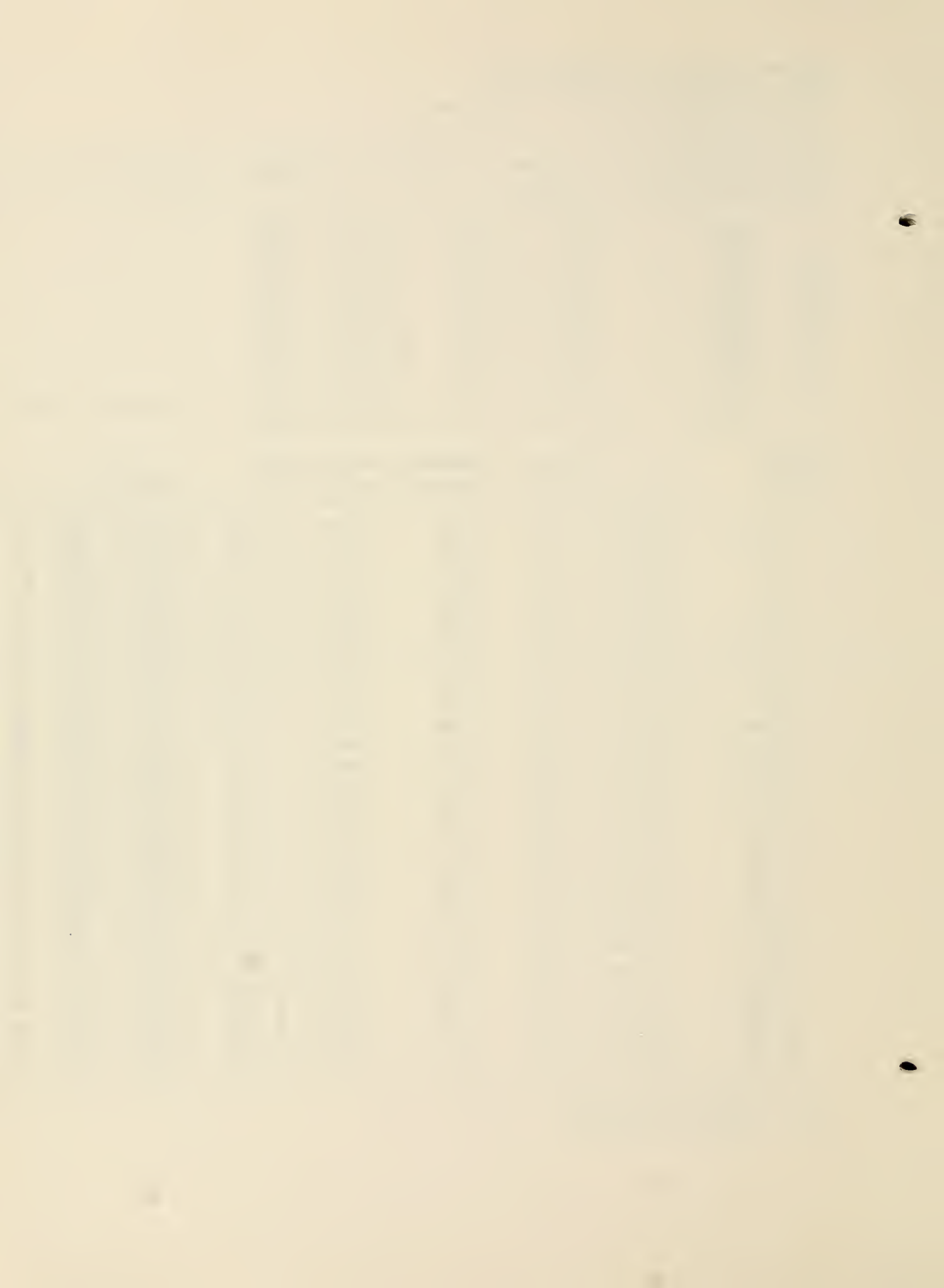
1	TRANS	*	0.371+-	0.179	1.348+-	0.670
8	GEO-F	*	10.661+-	1.242	38.716+-	6.559
26	LIME	*	1.799+-	0.485	6.534+-	1.937
65	DRBLD	*	0.348+-	0.230	1.263+-	0.851
67	BLFUP	*	1.024+-	0.246	3.718+-	1.002
73	ZHKLD	*	0.699+-	0.187	2.539+-	0.748
74	CUKST	*	2.340+-	0.524	8.496+-	2.169
78	QRCDM	*	1.121+-	0.764	4.069+-	2.819
79	WSTOV	*	2.730+-	1.393	9.912+-	5.203

TOTAL: 21.092+- 2.181 76.597+-12.306

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.803+-	0.134	2.917	0.808+-	0.078	1.006+-0.138 AL
2 SI *	2.863+-	0.491	10.398	2.711+-	0.262	0.947+-0.126 SI
3 P	0.078+-	0.010	0.283	0.040+-	0.002	0.514+-0.036 P
4 S	0.968+-	0.139	3.515	0.474+-	0.051	0.490+-0.059 S
5 CL	0.078+-	0.013	0.284	0.128+-	0.012	1.639+-0.290 CL
6 K *	0.263+-	0.039	0.956	0.265+-	0.016	1.005+-0.087 K
7 CA *	0.772+-	0.124	2.804	0.780+-	0.057	1.010+-0.104 CA
8 TI *	0.039+-	0.007	0.143	0.044+-	0.004	1.108+-0.157 TI
9 V	0.002+-	0.000	0.007	0.003+-	0.000	1.382+-0.218 V
10 CR	0.004+-	0.001	0.015	0.003+-	0.000	0.777+-0.094 CR
11 MN *	0.018+-	0.003	0.066	0.020+-	0.004	1.103+-0.326 MN
12 FE *	0.538+-	0.076	1.953	0.487+-	0.082	0.905+-0.205 FE
13 NI *	0.009+-	0.002	0.034	0.009+-	0.001	0.933+-0.148 NI
14 CU *	1.307+-	0.282	4.746	1.384+-	0.145	1.059+-0.161 CU
15 ZN *	0.585+-	0.093	2.126	0.589+-	0.063	1.007+-0.152 ZN
16 AS *	0.154+-	0.027	0.561	0.158+-	0.043	1.024+-0.403 AS
17 SE	0.002+-	0.000	0.008	0.004+-	0.000	1.964+-0.346 SE
18 BR *	0.031+-	0.005	0.114	0.031+-	0.010	0.995+-0.458 BR
19 SR *	0.007+-	0.001	0.026	0.004+-	0.002	0.597+-0.290 SR
20 PD	0.003+-	0.001	0.012	0.008+-	0.001	2.449+-0.954 PD
21 AG	0.005+-	0.002	0.019	0.010+-	0.007	1.939+-3.059 AG
22 CD *	0.115+-	0.022	0.416	0.116+-	0.011	1.011+-0.133 CD
23 IN	0.004+-	0.002	0.015	0.003+-	0.001	0.663+-0.271 IN
24 SH *	0.017+-	0.004	0.063	0.016+-	0.003	0.931+-0.241 SH
25 SB *	0.039+-	0.009	0.142	0.070+-	0.062	1.800+-3.297 SB
26 BA	0.038+-	0.013	0.139	0.004+-	0.006	0.109+-0.156 BA
27 HG	0.004+-	0.001	0.014	0.002+-	0.001	0.496+-0.145 HG
28 PB *	0.933+-	0.151	3.390	0.964+-	0.193	1.054+-0.300 PB

MEAS. AMB. MASS (UG/M3): 27.5

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT2.4

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 2

ALL VALID SAMPLES

SITE: DARTMAN

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.590 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.404+-	0.175	1.467+-	0.661
8	GEO-F	*	9.926+-	1.167	36.044+-	6.132
26	LIME	*	1.722+-	0.480	6.254+-	1.906
63	NDBLD	*	1.421+-	0.473	5.161+-	1.832
65	DRBLD	*	0.457+-	0.125	1.661+-	0.497
67	BLFUP	*	0.940+-	0.232	3.415+-	0.940
73	ZNKLD	*	0.641+-	0.169	2.328+-	0.678
74	CUKST	*	2.442+-	0.478	8.869+-	2.051
79	WSTOV	*	3.053+-	1.364	11.087+-	5.138

TOTAL: 21.007+- 2.009 76.287+-11.283

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.803+-	0.134	2.917	0.739+-	0.069	0.920+-0.117 AL
2 SI *	2.863+-	0.491	10.398	2.492+-	0.240	0.870+-0.111 SI
3 P	0.078+-	0.010	0.283	0.038+-	0.002	0.483+-0.028 P
4 S	0.968+-	0.139	3.515	0.401+-	0.026	0.415+-0.029 S
5 CL	0.078+-	0.013	0.284	0.129+-	0.011	1.645+-0.271 CL
6 K *	0.263+-	0.039	0.956	0.264+-	0.014	1.004+-0.077 K
7 CA *	0.772+-	0.124	2.804	0.781+-	0.053	1.011+-0.097 CA
8 TI *	0.039+-	0.007	0.143	0.041+-	0.004	1.027+-0.134 TI
9 V	0.002+-	0.000	0.007	0.003+-	0.000	1.336+-0.193 V
10 CR	0.004+-	0.001	0.015	0.005+-	0.000	1.282+-0.134 CR
11 MN *	0.018+-	0.003	0.066	0.023+-	0.002	1.273+-0.148 MN
12 FE *	0.538+-	0.076	1.953	0.511+-	0.037	0.951+-0.096 FE
13 NI *	0.009+-	0.002	0.034	0.009+-	0.001	0.940+-0.078 NI
14 CU *	1.307+-	0.282	4.746	1.395+-	0.132	1.068+-0.148 CU
15 ZN *	0.585+-	0.093	2.126	0.591+-	0.042	1.009+-0.102 ZN
16 AS *	0.154+-	0.027	0.561	0.162+-	0.014	1.052+-0.132 AS
17 SE	0.002+-	0.000	0.008	0.005+-	0.000	2.028+-0.318 SE
18 BR *	0.031+-	0.005	0.114	0.030+-	0.011	0.962+-0.463 BR
19 SR *	0.007+-	0.001	0.026	0.006+-	0.000	0.829+-0.062 SR
20 PD	0.003+-	0.001	0.012	0.009+-	0.001	2.604+-0.527 PD
21 AG	0.005+-	0.002	0.019	0.007+-	0.001	1.358+-0.240 AG
22 CD *	0.115+-	0.022	0.416	0.116+-	0.010	1.015+-0.121 CD
23 IH	0.004+-	0.002	0.015	0.002+-	0.001	0.573+-0.234 IH
24 SN *	0.017+-	0.004	0.063	0.017+-	0.001	0.954+-0.108 SN
25 SB *	0.039+-	0.009	0.142	0.034+-	0.003	0.860+-0.106 SB
26 BA	0.038+-	0.013	0.139	0.006+-	0.006	0.144+-0.147 BA
27 HG	0.004+-	0.001	0.014	0.002+-	0.000	0.580+-0.082 HG
28 PB *	0.933+-	0.151	3.390	0.960+-	0.054	1.029+-0.083 PB

MEAS. AMB. MASS (UG/M3): 27.5

* - FITTING ELEMENT

USER: E400

N3 F


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LABEL: PRT007 -FORM -COPIES 1

SPOOLED: 06/22/82 13:58
STARTED: 06/22/82 14:05, ON: CE2P BY: Q

CMBDEQ RESULTS FOR CMB # QF3.1

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 3

ALL VALID SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.533 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.435+-	0.196	3.092+-	1.472
13	GEO-K	*	2.886+-	0.256	20.519+-	3.586
65	DRBLD	*	0.322+-	0.113	2.287+-	0.871
67	BLFUP	*	0.770+-	0.206	5.471+-	1.678
71	SLPOR	*	0.484+-	0.204	3.443+-	1.539
73	ZHKLD	*	1.042+-	0.428	7.404+-	3.238
74	CUKST	*	1.090+-	0.297	7.746+-	2.412
77	SECSO	*	2.159+-	0.774	15.347+-	5.966

TOTAL: 9.187+- 1.035 65.309+-12.277

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.279+-	0.038	1.982	0.254+-	0.024	0.913+-0.118 AL
2 SI *	0.692+-	0.099	4.922	0.732+-	0.071	1.057+-0.149 SI
3 P	0.058+-	0.009	0.413	0.022+-	0.001	0.372+-0.025 P
4 S *	0.883+-	0.175	6.274	0.883+-	0.056	1.000+-0.090 S
5 CL	0.075+-	0.018	0.534	0.069+-	0.008	0.919+-0.152 CL
6 K *	0.109+-	0.016	0.778	0.087+-	0.005	0.791+-0.055 K
7 CA *	0.160+-	0.024	1.140	0.182+-	0.015	1.136+-0.143 CA
8 TI *	0.010+-	0.002	0.073	0.011+-	0.001	1.051+-0.132 TI
9 V	0.001+-	0.000	0.008	0.001+-	0.000	0.776+-0.202 V
10 CR	0.001+-	0.000	0.011	0.001+-	0.000	0.823+-0.178 CR
11 MN *	0.006+-	0.001	0.041	0.006+-	0.001	1.005+-0.128 MN
12 FE *	0.158+-	0.025	1.122	0.150+-	0.013	0.949+-0.111 FE
13 NI	0.005+-	0.001	0.037	0.006+-	0.000	1.117+-0.106 NI
14 CU *	0.639+-	0.150	4.543	0.638+-	0.059	0.998+-0.131 CU
15 ZN *	0.989+-	0.243	7.029	1.043+-	0.070	1.055+-0.103 ZN
16 AS *	0.272+-	0.069	1.937	0.267+-	0.019	0.978+-0.098 AS
17 SE	0.005+-	0.001	0.036	0.006+-	0.000	1.269+-0.143 SE
18 BR *	0.033+-	0.007	0.234	0.034+-	0.011	1.028+-0.493 BR
19 SR	0.003+-	0.000	0.019	0.002+-	0.000	0.653+-0.123 SR
20 PD	0.002+-	0.001	0.016	0.012+-	0.001	5.327+-2.686 PD
21 AG	0.004+-	0.002	0.029	0.006+-	0.001	1.351+-0.470 AG
22 CD *	0.121+-	0.035	0.862	0.145+-	0.013	1.197+-0.165 CD
23 IN	0.003+-	0.002	0.025	0.001+-	0.002	0.201+-0.533 IN
24 SH *	0.026+-	0.007	0.185	0.030+-	0.003	1.164+-0.168 SH
25 SB *	0.032+-	0.011	0.226	0.033+-	0.005	1.031+-0.226 SB
26 BA	0.009+-	0.007	0.067	0.020+-	0.010	2.119+-2.505 BA
27 HG	0.004+-	0.001	0.031	0.004+-	0.000	0.905+-0.131 HG
28 PB *	0.853+-	0.209	6.065	0.691+-	0.040	0.810+-0.061 PB

MEAS. AMB. MASS (UG/M3): 14.1

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # QF3 10

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 3

CO-COLLECTED SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.390 D OF F: 8

CODE SOURCE FLG UG/M3

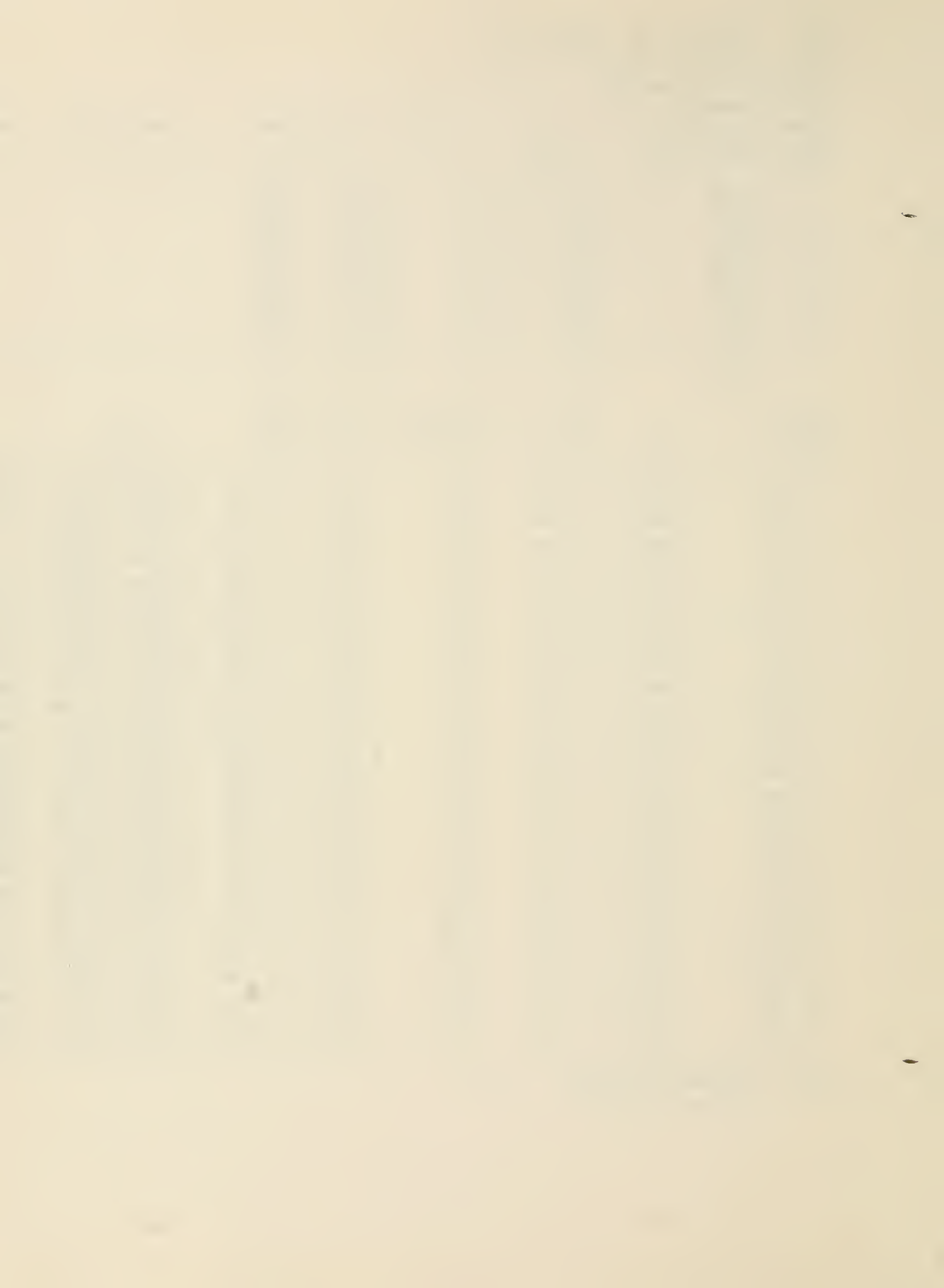
1	TRANS	*	0.446+- 0.210	3.276+- 1.630
13	GEO-K	*	3.110+- 0.285	22.850+- 4.263
65	DRBLD	*	0.380+- 0.131	2.794+- 1.063
67	BLFUP	*	0.852+- 0.243	6.256+- 2.052
71	SLPOR	*	0.550+- 0.236	4.038+- 1.854
73	ZNKLD	*	1.225+- 0.497	8.997+- 3.931
74	CUKST	*	1.254+- 0.342	9.210+- 2.928
77	SECSO	*	2.182+- 0.896	16.029+- 7.077

TOTAL:	9.997+- 1.193	73.450+-14.810
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.300+-	0.043	2.202	0.275+- 0.026	0.917+-0.118	AL
2 SI *	0.740+-	0.109	5.438	0.790+- 0.076	1.067+-0.151	SI
3 P	0.057+-	0.009	0.420	0.024+- 0.001	0.420+-0.028	P
4 S *	0.929+-	0.204	6.826	0.929+- 0.058	1.000+-0.088	S
5 CL	0.063+-	0.011	0.459	0.077+- 0.009	1.234+-0.236	CL
6 K *	0.114+-	0.019	0.840	0.096+- 0.005	0.838+-0.059	K
7 CA *	0.177+-	0.027	1.300	0.198+- 0.016	1.117+-0.138	CA
8 TI *	0.011+-	0.002	0.084	0.012+- 0.001	1.023+-0.126	TI
9 V	0.001+-	0.000	0.009	0.001+- 0.000	0.777+-0.200	V
10 CR	0.002+-	0.000	0.012	0.001+- 0.000	0.808+-0.168	CR
11 MN *	0.006+-	0.002	0.045	0.006+- 0.001	1.017+-0.130	MN
12 FE *	0.173+-	0.028	1.275	0.163+- 0.014	0.938+-0.108	FE
13 NI	0.006+-	0.001	0.045	0.007+- 0.000	1.076+-0.098	NI
14 CU *	0.733+-	0.173	5.384	0.730+- 0.068	0.997+-0.131	CU
15 ZN *	1.137+-	0.283	8.356	1.200+- 0.081	1.055+-0.104	ZN
16 AS *	0.315+-	0.080	2.318	0.310+- 0.023	0.983+-0.100	AS
17 SE	0.006+-	0.002	0.044	0.007+- 0.001	1.246+-0.139	SE
18 BR *	0.034+-	0.008	0.251	0.035+- 0.012	1.027+-0.486	BR
19 SR	0.003+-	0.001	0.022	0.002+- 0.000	0.645+-0.119	SR
20 PD	0.003+-	0.001	0.020	0.014+- 0.001	5.026+-2.345	PD
21 AG	0.005+-	0.002	0.034	0.006+- 0.001	1.383+-0.461	AG
22 CD *	0.134+-	0.042	0.986	0.161+- 0.014	1.197+-0.165	CD
23 IN	0.004+-	0.002	0.032	0.001+- 0.002	0.188+-0.466	IN
24 SH *	0.031+-	0.009	0.225	0.034+- 0.003	1.121+-0.155	SH
25 SB *	0.037+-	0.013	0.272	0.038+- 0.006	1.027+-0.218	SB
26 BA	0.012+-	0.008	0.085	0.022+- 0.011	1.856+-1.971	BA
27 HG	0.005+-	0.001	0.040	0.005+- 0.000	0.819+-0.110	HG
28 PB *	0.968+-	0.244	7.114	0.765+- 0.045	0.790+-0.059	PB

MEAS. AMB. MASS (UG/M3): 13.6

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF3.2

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 3

ALL VALID SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.190 D OF F: 8
CODE SOURCE FLG UG/M3 %

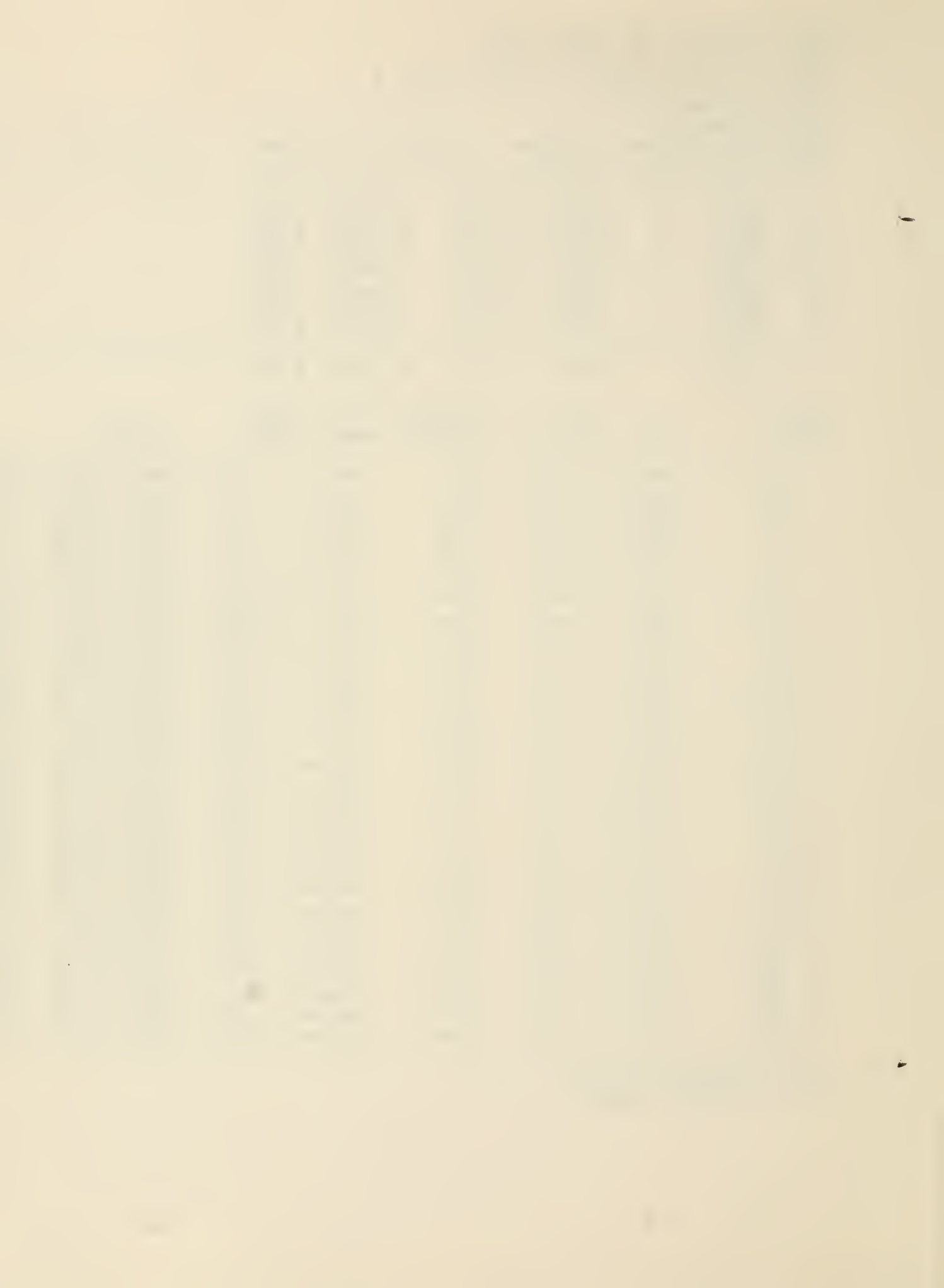
1	TRANS	*	0.175+- 0.095	1.450+- 0.811
14	GEO-L	*	4.671+- 0.763	38.798+- 8.069
65	DRBLD	*	0.114+- 0.091	0.947+- 0.769
67	BLFUP	*	0.475+- 0.209	3.949+- 1.813
73	ZHKLD	*	0.427+- 0.247	3.545+- 2.100
74	CUKST	*	1.192+- 0.559	9.897+- 4.813
77	SECSO	*	1.156+- 0.664	9.602+- 5.649

TOTAL:			8.209+- 1.207	68.189+-13.326
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.460+-	0.207	3.824	0.483+- 0.048	1.049+-0.150	AL
2 SI *	1.540+-	0.821	12.793	1.392+- 0.138	0.904+-0.121	SI
3 P	0.043+-	0.010	0.357	0.025+- 0.002	0.571+-0.047	P
4 S *	0.538+-	0.151	4.465	0.538+- 0.032	1.000+-0.083	S
5 CL	0.107+-	0.061	0.889	0.057+- 0.006	0.536+-0.060	CL
6 K *	0.117+-	0.041	0.973	0.105+- 0.009	0.897+-0.102	K
7 CA *	0.167+-	0.050	1.384	0.175+- 0.016	1.052+-0.140	CA
8 TI *	0.020+-	0.009	0.169	0.018+- 0.002	0.877+-0.113	TI
9 V	0.001+-	0.000	0.010	0.001+- 0.000	0.744+-0.243	V
10 CR	0.001+-	0.001	0.010	0.002+- 0.000	1.370+-0.333	CR
11 MN *	0.006+-	0.002	0.048	0.006+- 0.001	1.051+-0.146	MN
12 FE *	0.196+-	0.080	1.627	0.227+- 0.022	1.158+-0.175	FE
13 NI	0.004+-	0.001	0.031	0.004+- 0.000	1.187+-0.143	NI
14 CU *	0.681+-	0.296	5.657	0.681+- 0.065	0.999+-0.134	CU
15 ZN *	0.430+-	0.151	3.573	0.463+- 0.031	1.077+-0.107	ZN
16 AS *	0.099+-	0.052	0.821	0.100+- 0.007	1.011+-0.100	AS
17 SE	0.002+-	0.001	0.018	0.003+- 0.000	1.255+-0.184	SE
18 BR *	0.015+-	0.004	0.125	0.015+- 0.005	1.007+-0.431	BR
19 SR	0.001+-	0.000	0.012	0.002+- 0.000	1.084+-0.281	SR
20 PD	0.000+-	0.000	0.002	0.005+- 0.001	9.999+-9.999	PD
21 AG	0.003+-	0.001	0.022	0.003+- 0.001	1.209+-0.656	AG
22 CD *	0.069+-	0.036	0.574	0.083+- 0.008	1.205+-0.183	CD
23 IN	0.006+-	0.002	0.047	0.000+- 0.002	0.054+-0.312	IN
24 SN *	0.013+-	0.004	0.109	0.010+- 0.002	0.728+-0.206	SN
25 SB	0.007+-	0.004	0.062	0.010+- 0.004	1.318+-0.964	SB
26 BA	0.025+-	0.013	0.204	0.006+- 0.011	0.228+-0.448	BA
27 HG	0.002+-	0.001	0.016	0.002+- 0.000	1.103+-0.306	HG
28 PB *	0.601+-	0.334	4.989	0.390+- 0.024	0.650+-0.048	PB

MEAS. AMB. MASS (UG/M3): 12.0

* - FITTING ELEMENT



CHBDEQ RESULTS FOR CMB # QF3.20

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 3

CO-COLLECTED SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.162 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.136+- 0.114	1.548+- 0.967
14	GEO-L	*	5.100+- 1.029	42.364+-10.136
65	DRBLD	*	0.123+- 0.127	0.533+- 1.067
67	BLFUP	*	0.613+- 0.295	5.091+- 2.538
73	ZNKLD	*	0.423+- 0.311	3.516+- 2.624
74	CUKST	*	1.186+- 0.657	9.855+- 5.604
77	SECSO	*	1.431+- 0.884	11.882+- 7.502

TOTAL: 9.062+- 1.576 75.273+-16.290

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALCD. UG/M3	RATIO	
1 AL *	0.532+-	0.295	4.417	0.527+- 0.052	0.990+-0.138	AL
2 SI *	1.846+-	1.181	15.331	1.519+- 0.151	0.823+-0.106	SI
3 P	0.051+-	0.012	0.426	0.027+- 0.002	0.535+-0.043	P
4 S *	0.640+-	0.201	5.314	0.640+- 0.039	1.000+-0.086	S
5 CL	0.118+-	0.084	0.981	0.064+- 0.007	0.540+-0.066	CL
6 K *	0.131+-	0.056	1.091	0.116+- 0.010	0.887+-0.099	K
7 CA *	0.169+-	0.063	1.405	0.191+- 0.017	1.128+-0.156	CA
8 TI *	0.022+-	0.013	0.183	0.019+- 0.002	0.884+-0.114	TI
9 V	0.002+-	0.001	0.013	0.001+- 0.000	0.606+-0.187	V
10 CR	0.001+-	0.001	0.007	0.002+- 0.000	1.985+-0.634	CR
11 MH *	0.006+-	0.003	0.052	0.007+- 0.001	1.055+-0.147	MH
12 FE *	0.219+-	0.113	1.822	0.248+- 0.024	1.129+-0.168	FE
13 NI	0.004+-	0.001	0.034	0.005+- 0.000	1.115+-0.130	NI
14 CU *	0.686+-	0.350	5.699	0.681+- 0.064	0.993+-0.132	CU
15 ZN *	0.450+-	0.191	3.735	0.486+- 0.032	1.080+-0.104	ZN
16 AS *	0.109+-	0.072	0.908	0.111+- 0.008	1.012+-0.099	AS
17 SE	0.002+-	0.001	0.016	0.003+- 0.000	1.533+-0.258	SE
18 BR *	0.016+-	0.006	0.135	0.016+- 0.005	1.003+-0.425	BR
19 SR	0.001+-	0.001	0.012	0.002+- 0.000	1.282+-0.364	SR
20 PD	0.001+-	0.001	0.003	0.005+- 0.001	8.970+-14.1	PD
21 AG	0.002+-	0.001	0.017	0.004+- 0.001	1.836+-1.289	AG
22 CD *	0.087+-	0.051	0.727	0.106+- 0.010	1.214+-0.185	CD
23 IN	0.006+-	0.003	0.054	0.000+- 0.002	0.054+-0.299	IN
24 SH *	0.015+-	0.006	0.125	0.011+- 0.002	0.718+-0.196	SH
25 SB	0.007+-	0.005	0.060	0.011+- 0.005	1.500+-1.193	SB
26 BA	0.022+-	0.015	0.184	0.006+- 0.012	0.282+-0.551	BA
27 HG	0.002+-	0.001	0.019	0.002+- 0.000	1.025+-0.267	HG
28 PB *	0.720+-	0.476	5.983	0.461+- 0.030	0.641+-0.049	PB

MEAS. AMB. MASS (UG/M3): 12.0

* - FITTING ELEMENT

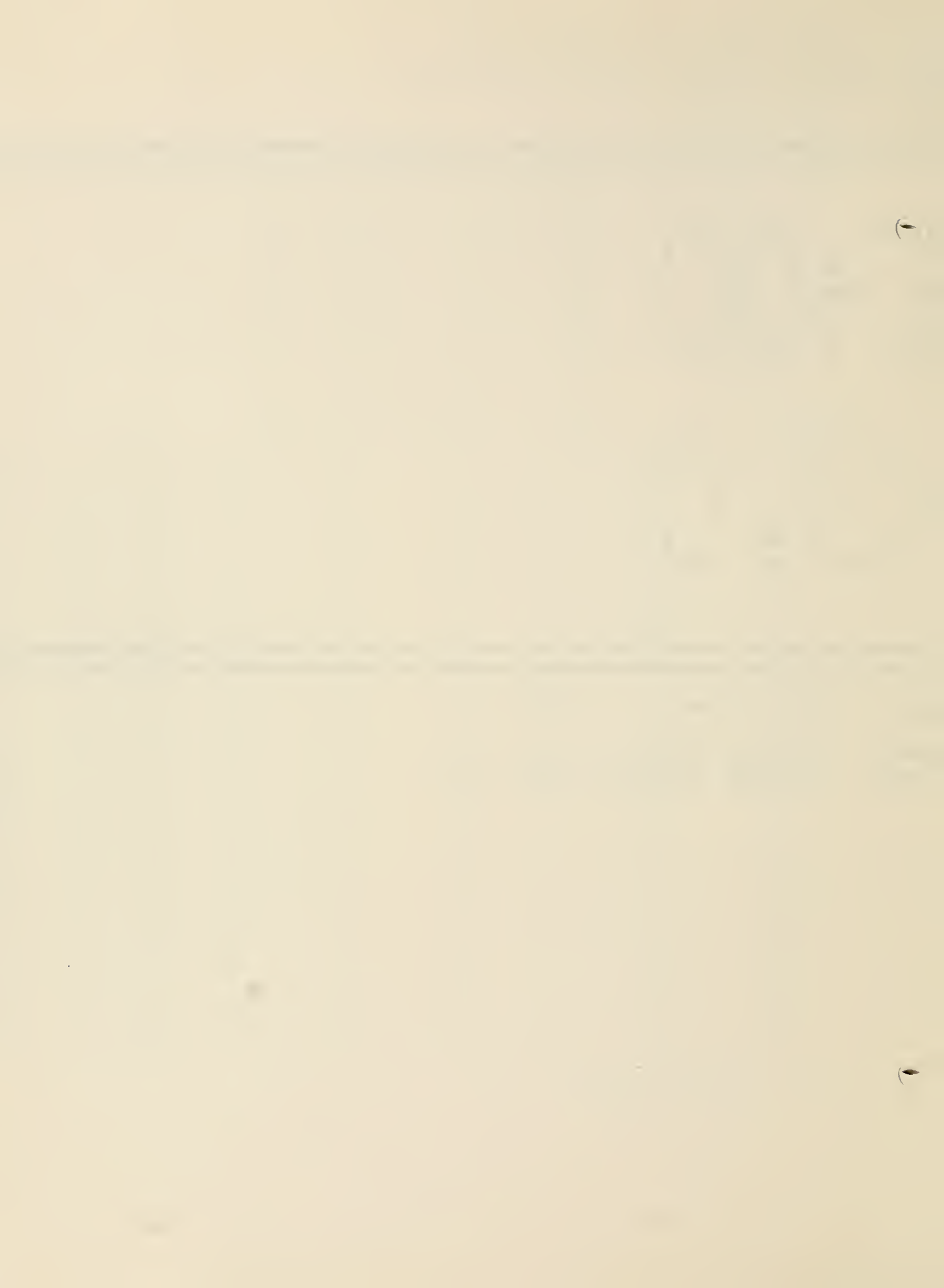
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CMBDE9 RESULTS FOR CMB # 903.1

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 3

ALL VALID SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.195 D OF F: 9

CODE SOURCE FLG UG/M3 %

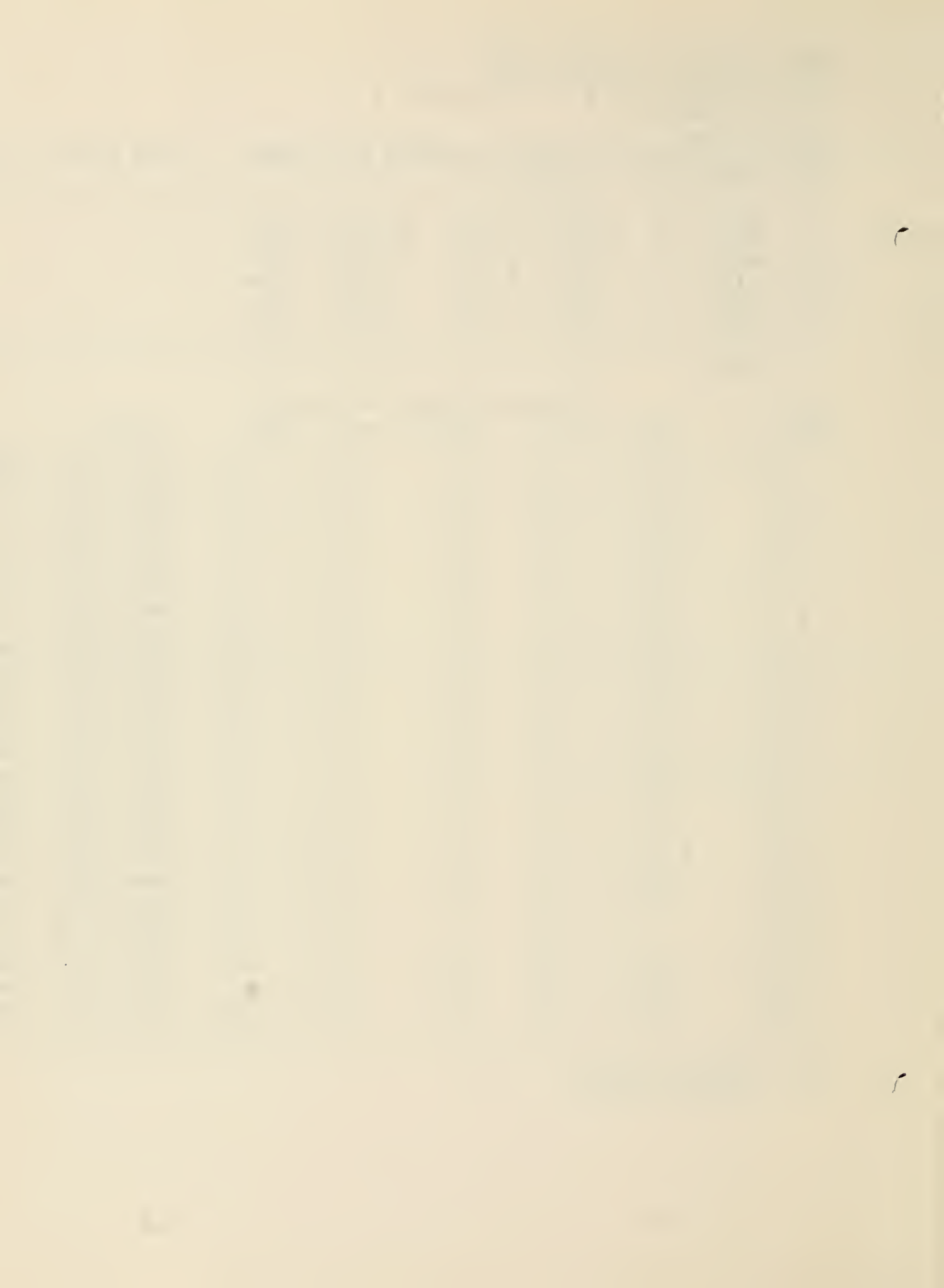
1	TRANS	*	0.038+- 0.027	0.274+- 0.201
13	GEO-K	*	8.643+- 0.971	62.800+-12.083
63	HDBLD	*	1.071+- 0.608	7.785+- 4.579
71	SLPOR	*	0.205+- 0.114	1.490+- 0.859
73	ZNKLD	*	0.261+- 0.145	1.899+- 1.096
74	CUKST	*	1.546+- 0.458	11.234+- 3.762

TOTAL: 11.764+- 1.247 85.483+-16.139

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 AL *	0.578+- 0.118	4.199	0.584+- 0.057	1.011+-0.141 AL
2 SI *	1.945+- 0.422	14.132	2.018+- 0.199	1.038+-0.147 SI
3 P	0.031+- 0.005	0.222	0.024+- 0.002	0.786+-0.079 P
4 S	0.366+- 0.072	2.662	0.287+- 0.020	0.783+-0.070 S
5 CL	0.030+- 0.009	0.219	0.040+- 0.004	1.321+-0.203 CL
6 K *	0.167+- 0.035	1.216	0.145+- 0.013	0.866+-0.102 K
7 CA *	0.526+- 0.117	3.826	0.493+- 0.045	0.935+-0.118 CA
8 TI *	0.031+- 0.006	0.227	0.033+- 0.005	1.066+-0.211 TI
9 Y	0.002+- 0.001	0.016	0.002+- 0.000	0.903+-0.159 Y
10 CR	0.002+- 0.000	0.017	0.004+- 0.000	1.469+-0.211 CR
11 MN *	0.015+- 0.003	0.108	0.017+- 0.001	1.116+-0.141 MN
12 FE *	0.467+- 0.087	3.395	0.454+- 0.039	0.971+-0.117 FE
13 NI	0.007+- 0.001	0.053	0.007+- 0.000	0.954+-0.083 NI
14 CU *	1.172+- 0.228	8.515	1.189+- 0.090	1.015+-0.110 CU
15 ZN *	0.438+- 0.075	3.184	0.439+- 0.025	1.001+-0.079 ZN
16 AS *	0.047+- 0.011	0.342	0.049+- 0.003	1.047+-0.095 AS
17 SE	0.001+- 0.000	0.010	0.002+- 0.000	1.606+-0.281 SE
18 BR *	0.007+- 0.001	0.048	0.007+- 0.001	1.001+-0.221 BR
19 SR	0.007+- 0.001	0.049	0.005+- 0.000	0.697+-0.064 SR
20 PD	0.003+- 0.001	0.019	0.002+- 0.001	0.778+-0.262 PD
21 AG	0.005+- 0.001	0.034	0.005+- 0.001	0.934+-0.290 AG
22 CD *	0.025+- 0.006	0.181	0.020+- 0.002	0.814+-0.091 CD
23 IN	< 0.001	---	0.000+- 0.001	0.000+-0.000 IN
24 SH *	0.017+- 0.004	0.122	0.016+- 0.002	0.970+-0.154 SH
25 SB *	0.021+- 0.008	0.156	0.026+- 0.003	1.193+-0.246 SB
26 BA	0.003+- 0.003	0.013	0.001+- 0.007	0.312+-2.184 BA
27 HG	0.002+- 0.001	0.015	0.001+- 0.000	0.617+-0.211 HG
28 PB *	0.475+- 0.096	3.452	0.458+- 0.030	0.964+-0.089 PB

MEAS. AMB. MASS (UG/M3): 13.8

* - FITTING ELEMENT



CMBDDQ RESULTS FOR CMB # RC3.1C

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 3

CO-COLLECTED SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.188 D OF F: 9

CODE SOURCE FLG UG/M3 %

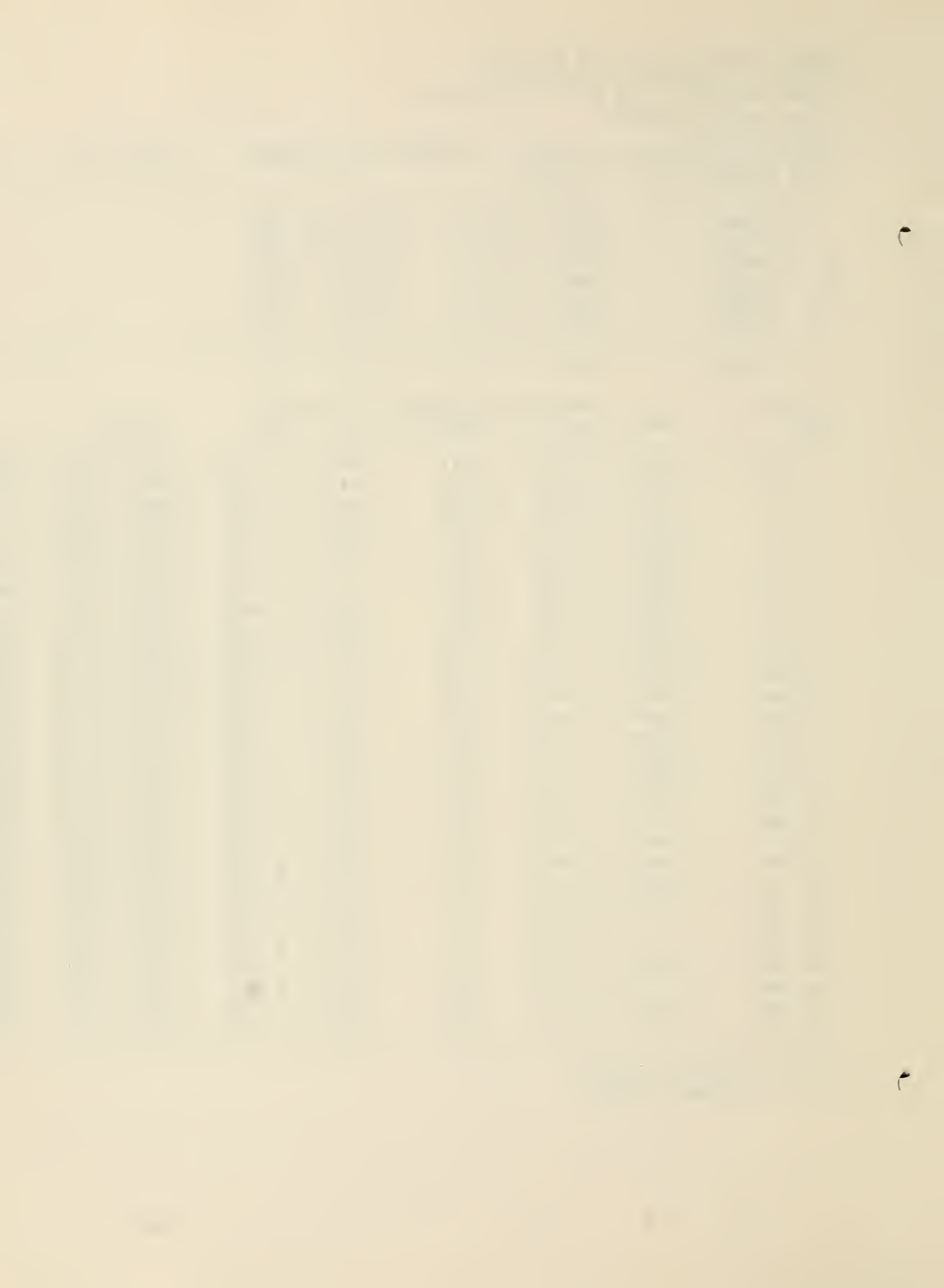
1	TRANS	*	0.041+- 0.030	0.307+- 0.231
13	GEO-K	*	8.094+- 0.948	60.182+-12.083
63	NDBLD	*	1.308+- 0.660	9.722+- 5.160
71	SLPOR	*	0.246+- 0.131	1.827+- 1.022
73	ZNKLD	*	0.299+- 0.168	2.223+- 1.302
74	CUKST	*	1.670+- 0.521	12.414+- 4.373

TOTAL:	11.658+- 1.286	86.675+-17.062
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SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.549+- 0.109	4.084	0.550+- 0.054	1.001+-0.138	AL	
2 SI *	1.827+- 0.386	13.582	1.898+- 0.186	1.039+-0.147	SI	
3 P	0.030+- 0.006	0.225	0.024+- 0.002	0.788+-0.077	P	
4 S	0.387+- 0.080	2.875	0.296+- 0.021	0.764+-0.068	S	
5 CL	0.028+- 0.010	0.210	0.043+- 0.004	1.517+-0.251	CL	
6 K *	0.159+- 0.034	1.185	0.140+- 0.012	0.875+-0.101	K	
7 CA *	0.532+- 0.133	3.957	0.471+- 0.042	0.885+-0.106	CA	
8 TI *	0.030+- 0.006	0.222	0.032+- 0.005	1.059+-0.240	TI	
9 W	0.002+- 0.000	0.014	0.002+- 0.000	0.990+-0.181	W	
10 CR	0.002+- 0.001	0.018	0.004+- 0.000	1.533+-0.215	CR	
11 MH *	0.015+- 0.003	0.109	0.017+- 0.001	1.123+-0.138	MH	
12 FE *	0.451+- 0.087	3.350	0.444+- 0.037	0.984+-0.115	FE	
13 NI	0.007+- 0.001	0.055	0.007+- 0.000	0.976+-0.085	NI	
14 CU *	1.219+- 0.263	9.063	1.239+- 0.096	1.016+-0.112	CU	
15 ZN *	0.472+- 0.087	3.512	0.474+- 0.026	1.004+-0.078	ZN	
16 AS *	0.052+- 0.013	0.386	0.052+- 0.003	0.999+-0.084	AS	
17 SE	0.001+- 0.000	0.011	0.002+- 0.000	1.666+-0.272	SE	
18 BR *	0.007+- 0.002	0.051	0.007+- 0.001	1.001+-0.232	BR	
19 SR	0.007+- 0.001	0.050	0.005+- 0.000	0.716+-0.063	SR	
20 PD	0.002+- 0.001	0.019	0.002+- 0.001	0.885+-0.274	PD	
21 AG	0.004+- 0.001	0.031	0.005+- 0.001	1.179+-0.337	AG	
22 CD *	0.026+- 0.007	0.194	0.021+- 0.002	0.802+-0.084	CD	
23 IH	< 0.001	---	0.000+- 0.001	0.000+-0.000	IH	
24 SH *	0.018+- 0.005	0.135	0.018+- 0.002	0.998+-0.144	SH	
25 SB *	0.023+- 0.009	0.170	0.027+- 0.003	1.192+-0.220	SB	
26 BA	< 0.001	---	0.001+- 0.007	0.000+-0.000	BA	
27 HG	0.002+- 0.001	0.016	0.001+- 0.000	0.615+-0.183	HG	
28 PB *	0.502+- 0.112	3.732	0.480+- 0.031	0.957+-0.085	PB	

MEAS. AMB. MASS (UG/M3): 13.4

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QC3.2

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 3

ALL VALID SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.306 D OF F: 9
CODE SOURCE FLG UG/M3 %

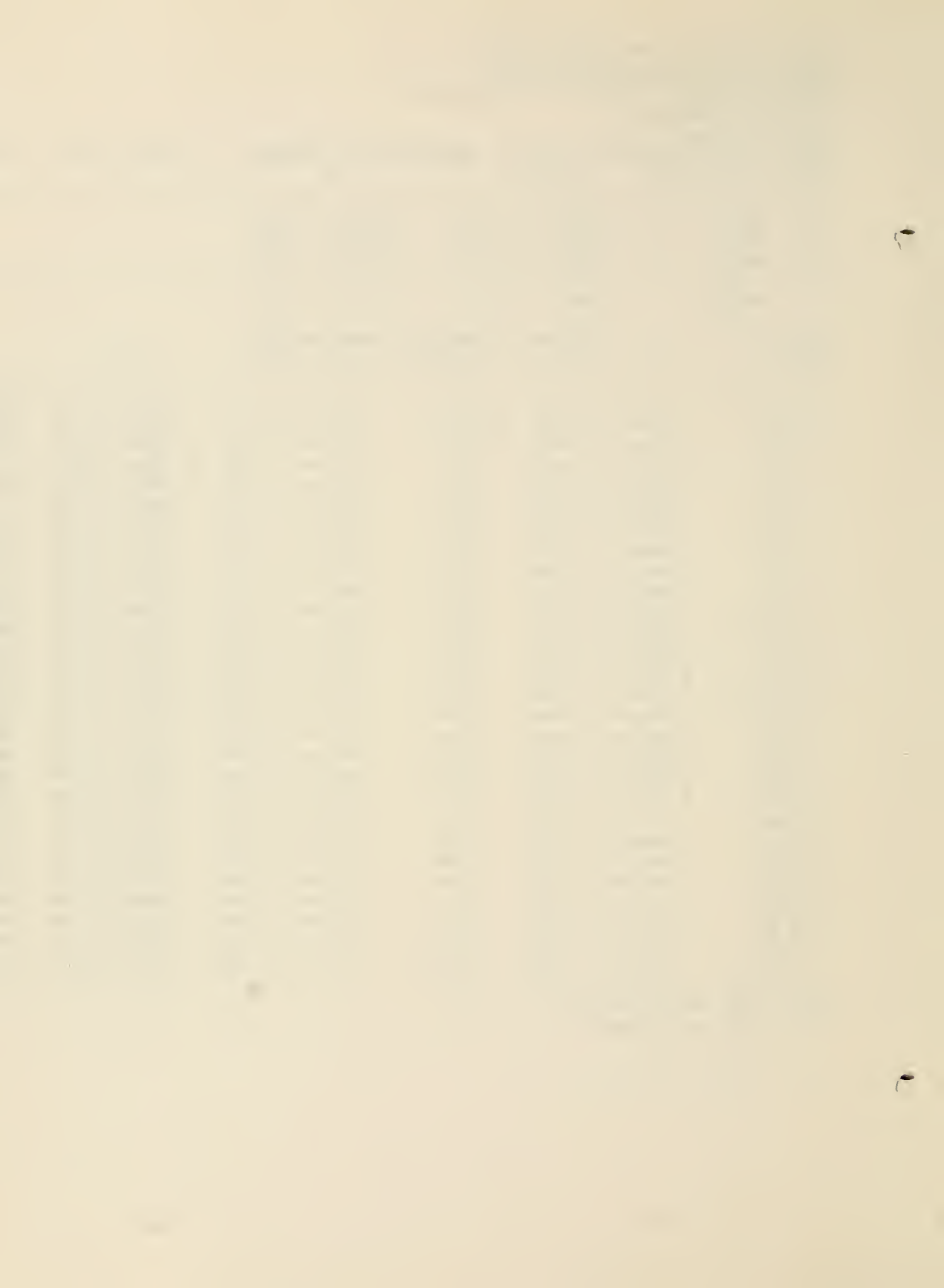
14	GEO-L	*	4.866+- 0.452	64.233+-14.960
73	ZNKLD	*	0.131+- 0.054	1.724+- 0.799
74	CUKST	*	1.152+- 0.451	15.214+- 6.781

TOTAL:			6.149+- 0.641	81.171+-19.289
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SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1	AL *	0.415+- 0.122	5.484	0.415+- 0.041	0.999+-0.140	AL
2	SI *	1.525+- 0.513	20.138	1.379+- 0.137	0.904+-0.121	SI
3	P	0.016+- 0.003	0.211	0.013+- 0.001	0.842+-0.092	P
4	S	0.133+- 0.021	1.762	0.118+- 0.008	0.884+-0.081	S
5	CL	0.020+- 0.010	0.271	0.029+- 0.003	1.435+-0.217	CL
6	K *	0.099+- 0.027	1.302	0.099+- 0.010	1.006+-0.138	K
7	CA *	0.201+- 0.029	2.660	0.174+- 0.017	0.865+-0.109	CA
8	TI *	0.020+- 0.006	0.261	0.022+- 0.002	1.113+-0.165	TI
9	V	0.001+- 0.000	0.016	0.001+- 0.000	1.026+-0.174	V
10	CR	0.001+- 0.000	0.018	0.002+- 0.000	1.244+-0.179	CR
11	MN *	0.006+- 0.001	0.084	0.007+- 0.001	1.086+-0.159	MN
12	FE *	0.215+- 0.044	2.833	0.254+- 0.025	1.185+-0.183	FE
13	NI	0.003+- 0.001	0.041	0.004+- 0.000	1.160+-0.128	NI
14	CU *	0.654+- 0.238	8.635	0.703+- 0.063	1.075+-0.141	CU
15	ZN *	0.140+- 0.032	1.846	0.145+- 0.010	1.037+-0.106	ZN
16	AS *	0.012+- 0.004	0.154	0.011+- 0.001	0.906+-0.106	AS
17	SE	0.001+- 0.000	0.009	0.001+- 0.000	1.150+-0.159	SE
18	BR	0.001+- 0.000	0.018	0.001+- 0.000	1.025+-0.116	BR
19	SR	0.002+- 0.000	0.033	0.002+- 0.000	0.870+-0.109	SR
20	PD	0.001+- 0.001	0.017	0.000+- 0.000	0.153+-0.200	PD
21	AG	< 0.001	---	0.001+- 0.000	0.000+-0.000	AG
22	CD *	0.006+- 0.003	0.084	0.004+- 0.001	0.593+-0.137	CD
23	IN	0.001+- 0.001	0.006	0.000+- 0.001	0.048+-0.704	IN
24	SH	0.003+- 0.002	0.040	0.003+- 0.001	1.062+-0.393	SH
25	SB	< 0.001	---	0.005+- 0.002	0.000+-0.000	SB
26	BA	0.010+- 0.007	0.137	0.000+- 0.004	0.014+-0.358	BA
27	HG	0.001+- 0.000	0.013	0.000+- 0.000	0.493+-0.171	HG
28	PB *	0.122+- 0.032	1.613	0.101+- 0.008	0.830+-0.090	PB

MEAS. AMB. MASS (UG/M3): 7.6

* - FITTING ELEMENT



CM8DEQ RESULTS FOR CMB # QC3.2C

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 3

CO-COLLECTED SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.314 D OF F: 9

CODE SOURCE FLG UG/M3 %

14	GEO-L	*	5.929+-	0.547	66.680+-	17.312
73	ZHKLD	*	0.142+-	0.065	1.599+-	0.827
74	CUKST	*	1.504+-	0.606	16.917+-	7.959

TOTAL:		7.575+-	0.819	85.196+-	22.635
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SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO				
1	AL *	0.503+-	0.166	5.660	0.506+-	0.050	1.005+-	0.141	AL
2	SI *	1.885+-	0.710	21.199	1.680+-	0.167	0.891+-	0.119	SI
3	P	0.019+-	0.003	0.215	0.017+-	0.001	0.868+-	0.095	P
4	S	0.151+-	0.018	1.703	0.148+-	0.010	0.976+-	0.094	S
5	CL	0.024+-	0.014	0.265	0.038+-	0.003	1.606+-	0.265	CL
6	K *	0.124+-	0.036	1.400	0.121+-	0.012	0.972+-	0.131	K
7	CA *	0.235+-	0.026	2.645	0.213+-	0.020	0.906+-	0.116	CA
8	TI *	0.025+-	0.008	0.277	0.027+-	0.003	1.093+-	0.160	TI
9	V	0.001+-	0.001	0.016	0.001+-	0.000	1.070+-	0.186	V
10	CR	0.001+-	0.001	0.016	0.002+-	0.000	1.524+-	0.250	CR
11	MN *	0.007+-	0.002	0.084	0.008+-	0.001	1.129+-	0.169	MN
12	FE *	0.261+-	0.055	2.931	0.310+-	0.031	1.190+-	0.184	FE
13	NI	0.004+-	0.002	0.042	0.005+-	0.000	1.235+-	0.144	NI
14	CU *	0.837+-	0.321	9.413	0.911+-	0.082	1.089+-	0.145	CU
15	ZN *	0.162+-	0.039	1.820	0.166+-	0.012	1.027+-	0.103	ZN
16	AS *	0.014+-	0.006	0.155	0.013+-	0.001	0.921+-	0.111	AS
17	SE	0.001+-	0.000	0.012	0.001+-	0.000	0.839+-	0.101	SE
18	BR	0.002+-	0.001	0.018	0.002+-	0.000	1.091+-	0.129	BR
19	SR	0.003+-	0.001	0.033	0.003+-	0.000	0.917+-	0.117	SR
20	PD	0.001+-	0.001	0.007	0.000+-	0.000	0.203+-	0.268	PD
21	AG	<	0.001	---	0.001+-	0.001	0.000+-	0.000	AG
22	CD *	0.009+-	0.004	0.105	0.005+-	0.001	0.505+-	0.111	CD
23	IN	0.001+-	0.001	0.008	0.000+-	0.001	0.034+-	0.551	IN
24	SH	0.004+-	0.003	0.048	0.004+-	0.001	0.889+-	0.307	SH
25	SB	<	0.001	---	0.006+-	0.002	0.000+-	0.000	SB
26	BA	0.015+-	0.010	0.169	0.000+-	0.005	0.013+-	0.304	BA
27	HG	0.000+-	0.000	0.006	0.001+-	0.000	1.192+-	0.586	HG
28	PB *	0.139+-	0.041	1.568	0.122+-	0.010	0.874+-	0.098	PB

MEAS. AMB. MASS (UG/M3): 8.9

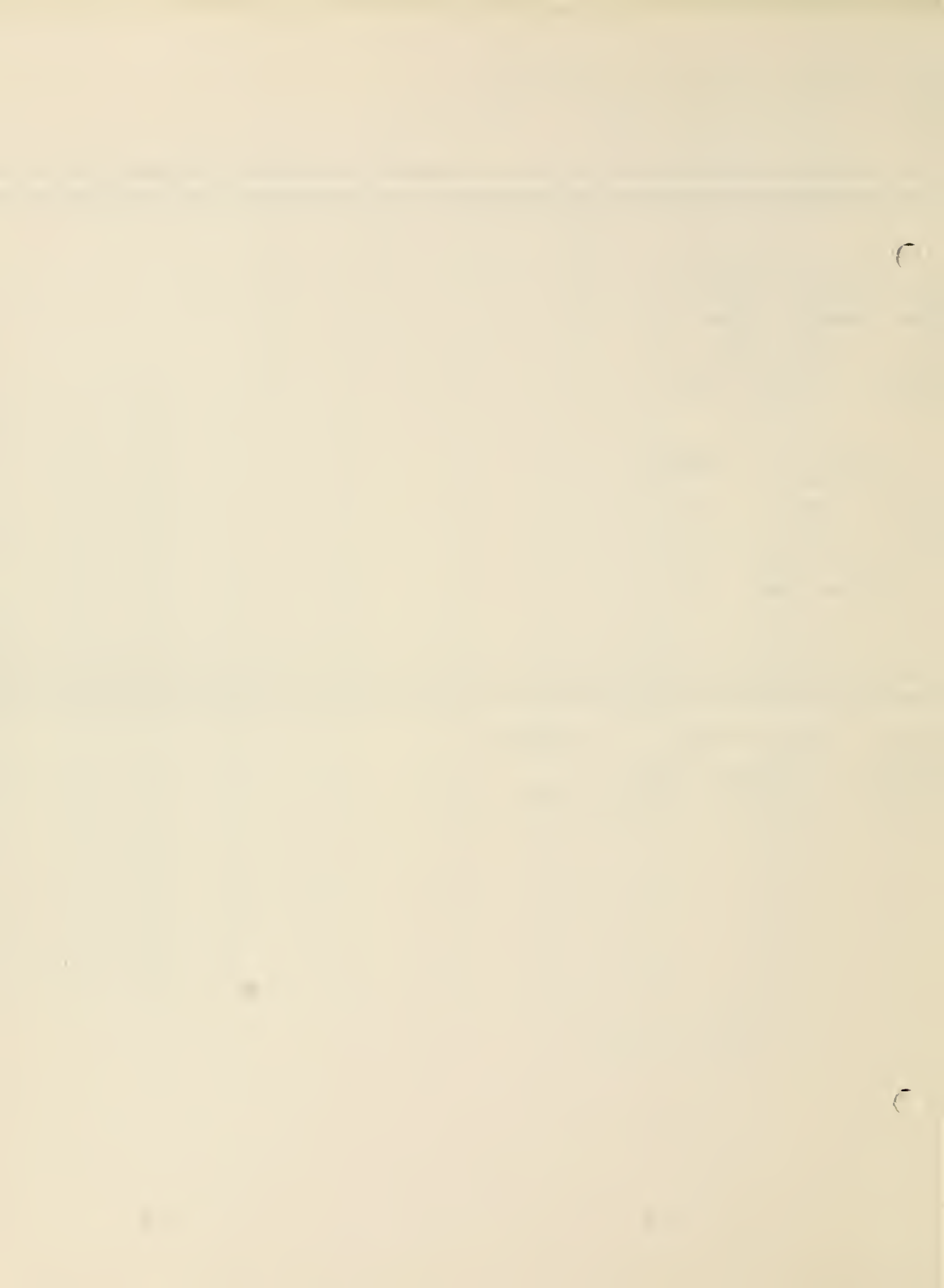
* - FITTING ELEMENT

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CMBDEQ RESULTS FOR CMB # Q73.1

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 3

ALL VALID SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.064 D OF F: 6

CODE SOURCE FLG UG/M3 %

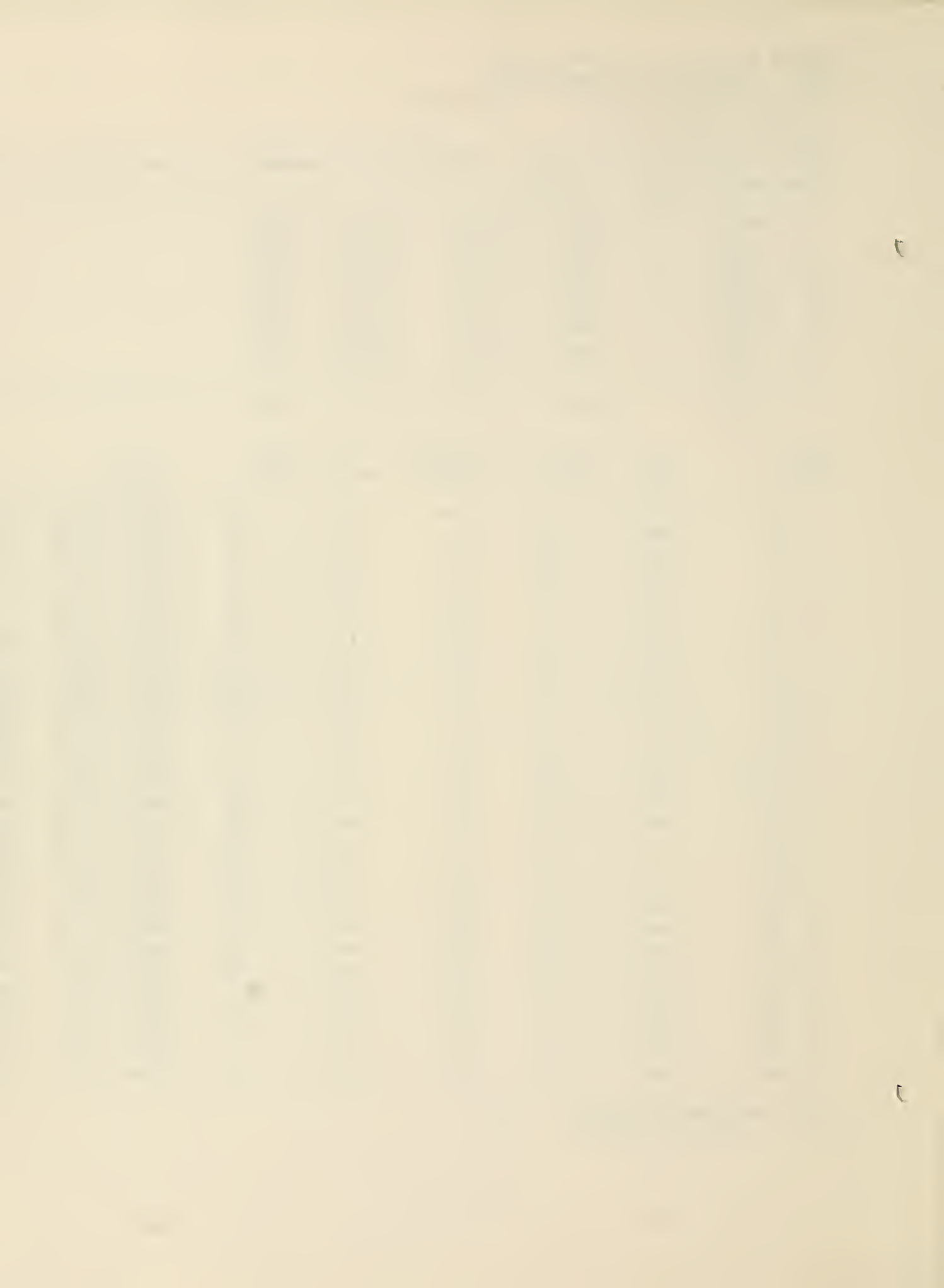
1	TRANS	*	1.269+-	0.546	1.540+-	0.681
13	GEO-K	*	39.043+-	3.660	47.381+-	6.533
63	NDBLD	*	7.832+-	2.809	9.504+-	3.542
65	DRBLD	*	1.511+-	0.748	1.834+-	0.926
67	BLFUP	*	3.383+-	1.210	4.106+-	1.526
71	SLPDR	*	4.642+-	2.653	5.633+-	3.270
73	ZNKLD	*	3.624+-	2.021	4.399+-	2.493
74	CUKST	*	4.183+-	1.728	5.076+-	2.159

TOTAL:			65.487+-	6.142	79.472+-	10.961

SPECIE CODE		MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC.	UG/M3	RATIO		
1	AL *	2.363+-	0.239	2.794	2.224+-	0.213	0.966+-	0.129	AL
2	SI *	8.003+-	0.878	9.712	7.921+-	0.768	0.990+-	0.135	SI
3	P	0.208+-	0.025	0.252	0.137+-	0.007	0.661+-	0.042	P
4	S	3.396+-	0.490	4.122	1.859+-	0.121	0.547+-	0.041	S
5	CL	0.119+-	0.027	0.145	0.270+-	0.036	2.261+-	0.744	CL
6	K *	0.765+-	0.079	0.929	0.761+-	0.050	0.994+-	0.091	K
7	CA *	2.189+-	0.268	2.657	2.132+-	0.170	0.974+-	0.108	CA
8	TI *	0.125+-	0.015	0.152	0.134+-	0.012	1.069+-	0.137	TI
9	V	0.013+-	0.001	0.016	0.010+-	0.001	0.768+-	0.084	V
10	CR	0.015+-	0.002	0.019	0.028+-	0.002	1.802+-	0.236	CR
11	MN *	0.096+-	0.017	0.117	0.094+-	0.006	0.970+-	0.092	MN
12	FE *	2.436+-	0.310	2.957	2.509+-	0.170	1.030+-	0.100	FE
13	NI *	0.046+-	0.006	0.056	0.046+-	0.002	0.998+-	0.069	NI
14	CU *	5.760+-	0.923	6.990	5.775+-	0.394	1.003+-	0.097	CU
15	ZN *	5.152+-	0.881	6.252	5.164+-	0.286	1.002+-	0.079	ZN
16	AS *	0.942+-	0.120	1.143	0.943+-	0.054	1.000+-	0.082	AS
17	SE	0.019+-	0.002	0.023	0.034+-	0.002	1.766+-	0.194	SE
18	BR *	0.109+-	0.013	0.133	0.110+-	0.033	1.006+-	0.429	BR
19	SR	0.041+-	0.007	0.050	0.034+-	0.002	0.840+-	0.067	SR
20	PD	0.025+-	0.006	0.030	0.034+-	0.002	1.394+-	0.159	PD
21	AG	0.043+-	0.006	0.052	0.047+-	0.003	1.095+-	0.103	AG
22	CD *	0.488+-	0.122	0.592	0.490+-	0.036	1.003+-	0.103	CD
23	IN	0.019+-	0.006	0.023	0.009+-	0.003	0.481+-	0.171	IN
24	SN	0.157+-	0.023	0.190	0.263+-	0.019	1.678+-	0.232	SN
25	SB	0.233+-	0.031	0.282	0.286+-	0.015	1.231+-	0.106	SB
26	BA	0.072+-	0.024	0.088	0.064+-	0.018	0.879+-	0.324	BA
27	HG	0.024+-	0.004	0.029	0.016+-	0.001	0.683+-	0.072	HG
28	PB *	5.407+-	0.929	6.562	5.355+-	0.264	0.990+-	0.069	PB

MEAS. AMB. MASS (UG/M3): 82.4

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QTS.1C

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 3

CO-COLLECTED SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.107 D OF F: 6

CODE SOURCE FLG UG/M3 %

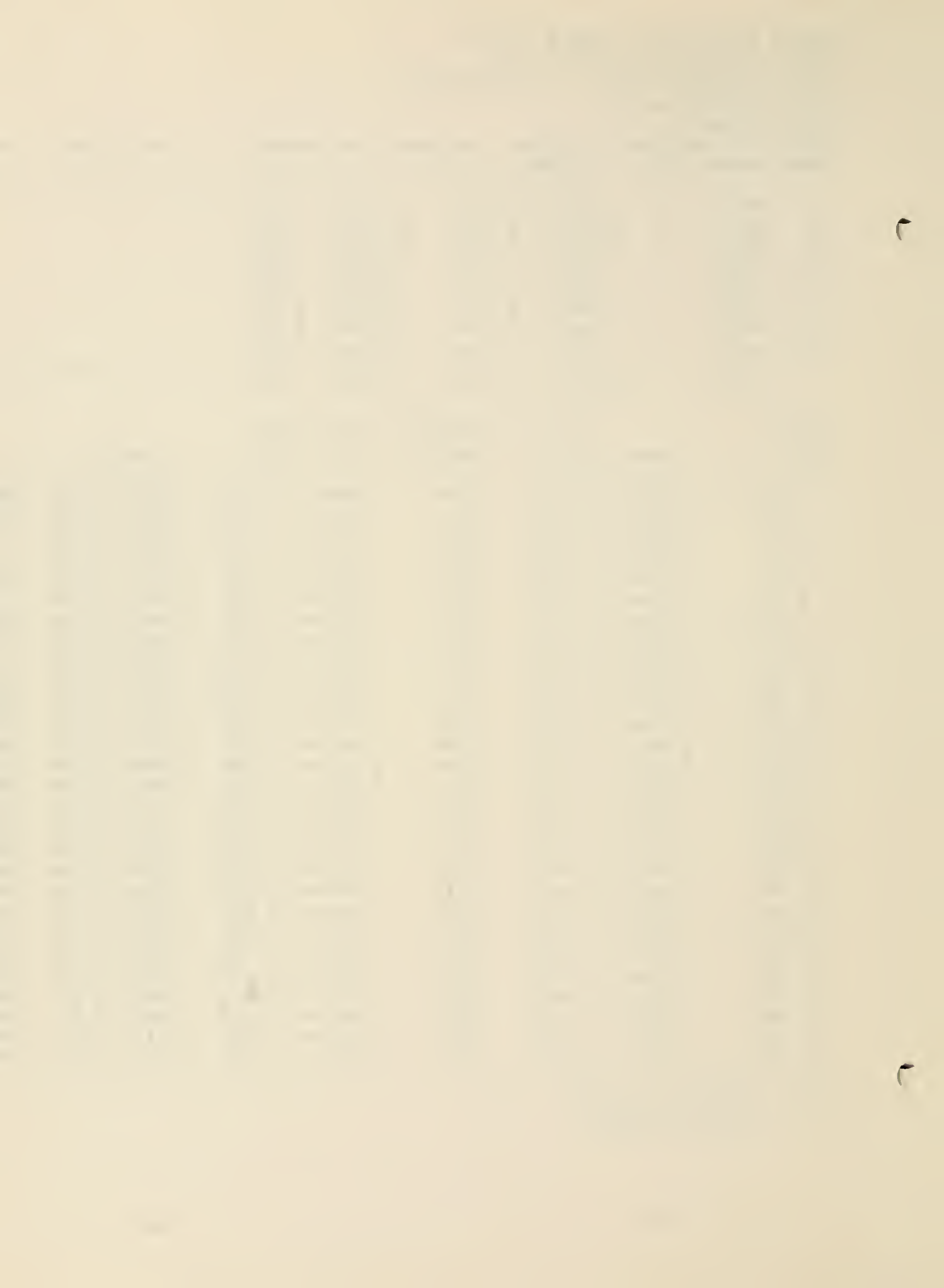
1	TRANS	*	1.299+-	0.559	1.643+-	0.725
13	GEO-K	*	36.643+-	3.603	46.347+-	6.404
63	HDBLD	*	8.797+-	3.178	11.127+-	4.162
65	DRBLD	*	1.896+-	0.743	2.398+-	0.968
67	BLFUP	*	3.510+-	1.467	4.439+-	1.905
71	SLPOR	*	3.661+-	2.457	4.631+-	3.141
73	ZHKLD	*	4.645+-	2.189	5.875+-	2.827
74	CUKST	*	4.237+-	1.868	5.359+-	2.419

TOTAL: 64.688+- 6.358 81.819+-11.302

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO		
1 AL *	2.187+-	0.244	2.766	2.098+-	0.200	0.959+-0.127	AL
2 SI *	7.518+-	0.864	9.509	7.453+-	0.721	0.991+-0.135	SI
3 P	0.207+-	0.027	0.262	0.137+-	0.007	0.663+-0.041	P
4 S	3.419+-	0.550	4.324	1.868+-	0.128	0.546+-0.043	S
5 CL	0.103+-	0.026	0.131	0.282+-	0.037	2.723+-1.044	CL
6 K *	0.706+-	0.070	0.893	0.704+-	0.046	0.997+-0.091	K
7 CA *	2.158+-	0.303	2.730	2.043+-	0.160	0.947+-0.102	CA
8 TI *	0.117+-	0.014	0.147	0.127+-	0.011	1.088+-0.140	TI
9 V	0.013+-	0.002	0.017	0.010+-	0.001	0.746+-0.079	V
10 CR	0.015+-	0.002	0.019	0.023+-	0.002	1.902+-0.264	CR
11 MN *	0.100+-	0.021	0.127	0.094+-	0.006	0.940+-0.087	MN
12 FE *	2.398+-	0.356	3.033	2.473+-	0.166	1.031+-0.099	FE
13 NI *	0.047+-	0.007	0.059	0.047+-	0.002	0.996+-0.067	NI
14 CU *	5.612+-	1.034	7.098	5.642+-	0.380	1.005+-0.096	CU
15 ZN *	5.543+-	1.047	7.011	5.531+-	0.328	0.998+-0.084	ZN
16 AS *	1.003+-	0.122	1.269	1.003+-	0.063	1.000+-0.088	AS
17 SE	0.020+-	0.003	0.025	0.036+-	0.002	1.817+-0.214	SE
18 BR *	0.113+-	0.013	0.143	0.113+-	0.034	1.001+-0.425	BR
19 SR	0.043+-	0.009	0.055	0.035+-	0.002	0.799+-0.064	SR
20 PD	0.026+-	0.007	0.033	0.040+-	0.003	1.516+-0.180	PD
21 AG	0.043+-	0.007	0.055	0.050+-	0.003	1.163+-0.110	AG
22 CD *	0.525+-	0.153	0.664	0.512+-	0.037	0.975+-0.098	CD
23 IN	0.021+-	0.007	0.026	0.010+-	0.003	0.489+-0.150	IN
24 SH	0.166+-	0.025	0.210	0.236+-	0.015	1.420+-0.158	SH
25 SB	0.230+-	0.029	0.290	0.291+-	0.016	1.266+-0.111	SB
26 BA	0.075+-	0.027	0.095	0.064+-	0.017	0.847+-0.291	BA
27 HG	0.027+-	0.004	0.035	0.017+-	0.001	0.618+-0.063	HG
28 PB *	5.613+-	1.081	7.099	5.706+-	0.282	1.017+-0.072	PB

MEAS. AMB. MASS (UG/M3): 79.1

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT3.2

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 3

ALL VALID SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.122 D OF F: 2

CODE SOURCE FLG UG/M3 %

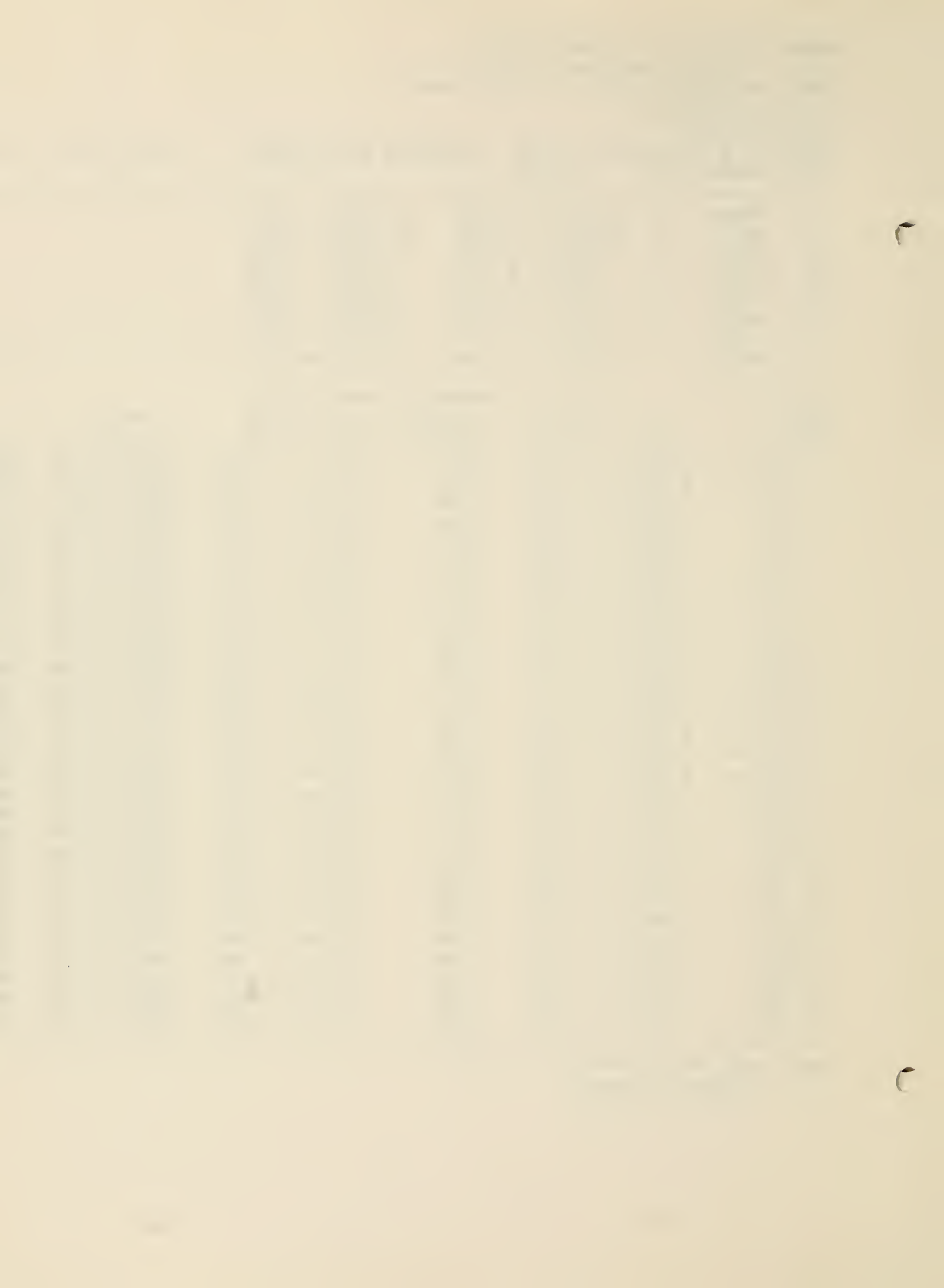
1	TRANS	*	0.514+-	0.294	0.804+-	0.495
14	GEO-L	*	35.866+-	4.915	56.142+-	15.007
65	DRBLD	*	0.912+-	0.671	1.427+-	1.101
67	BLFUP	*	1.669+-	0.970	2.612+-	1.632
73	ZNKLD	*	2.141+-	1.041	3.351+-	1.802
74	CUKST	*	8.113+-	3.596	12.699+-	6.339

TOTAL:	49.213+-	6.296	77.035+-	20.241
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	2.526+-	1.000	3.955	2.950+-	0.291	AL
2 SI *	9.929+-	4.478	15.542	10.429+-	1.039	SI
3 P	0.126+-	0.029	0.198	0.104+-	0.008	P
4 S	1.501+-	0.403	2.350	0.993+-	0.059	S
5 CL	0.283+-	0.193	0.444	0.270+-	0.024	CL
6 K *	0.621+-	0.229	0.973	0.653+-	0.060	K
7 CA *	1.246+-	0.284	1.950	1.118+-	0.103	CA
8 TI *	0.132+-	0.054	0.206	0.145+-	0.014	TI
9 V	0.012+-	0.004	0.018	0.010+-	0.001	V
10 CR	0.013+-	0.004	0.020	0.011+-	0.001	CR
11 MN *	0.055+-	0.015	0.085	0.046+-	0.004	MN
12 FE *	1.561+-	0.501	2.443	1.708+-	0.166	FE
13 NI *	0.030+-	0.011	0.047	0.029+-	0.002	NI
14 CU *	5.190+-	2.548	8.124	5.433+-	0.450	CU
15 ZN *	1.822+-	0.638	2.852	1.851+-	0.141	ZN
16 AS *	0.337+-	0.153	0.528	0.342+-	0.028	AS
17 SE	0.010+-	0.003	0.016	0.012+-	0.001	SE
18 BR *	0.047+-	0.014	0.074	0.048+-	0.013	BR
19 SR	0.013+-	0.004	0.021	0.016+-	0.001	SR
20 PD	0.011+-	0.006	0.018	0.016+-	0.002	PD
21 AG	0.020+-	0.005	0.032	0.015+-	0.002	AG
22 CD *	0.197+-	0.103	0.308	0.210+-	0.017	CD
23 IN	0.007+-	0.004	0.011	0.003+-	0.003	IN
24 SH	0.036+-	0.011	0.056	0.038+-	0.004	SH
25 SB	0.062+-	0.027	0.097	0.068+-	0.008	SB
26 BA	0.106+-	0.035	0.166	0.023+-	0.017	BA
27 HG	0.007+-	0.002	0.011	0.006+-	0.001	HG
28 PB *	2.122+-	0.997	3.322	1.774+-	0.098	PB

MEAS. AMB. MASS (UG/M3): 63.9

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT3.20

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 3

CO-COLLECTED SAMPLES

SITE: FIREHALL

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.054 D OF F: 8

CODE SOURCE FLG UG/M3 %

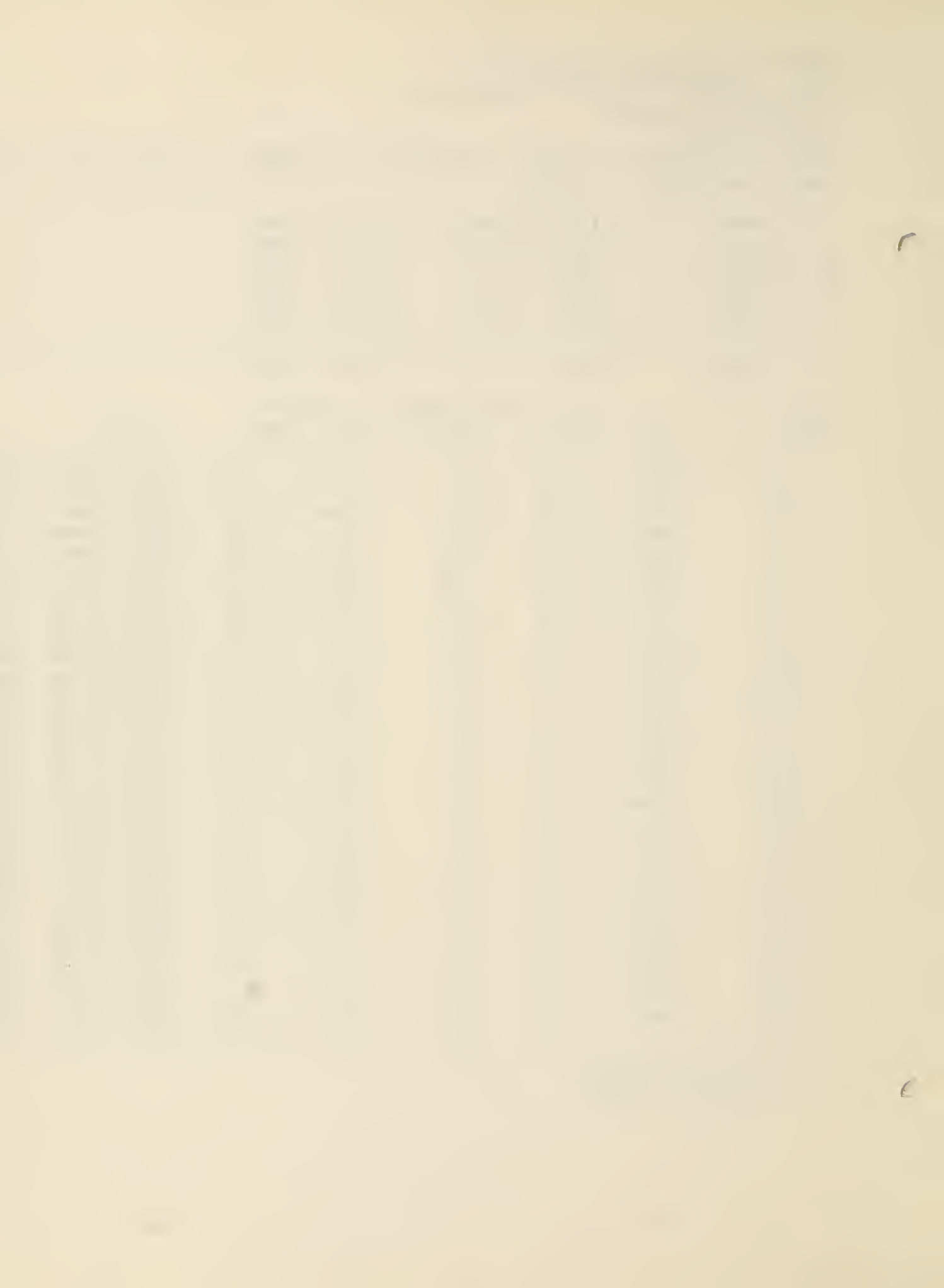
1	TRANS	*	0.470+-	0.299	0.717+-	0.495
14	GEO-L	*	37.914+-	5.816	57.815+-	18.085
65	DRBLD	*	0.790+-	0.761	0.603+-	1.206
67	BLFUP	*	1.608+-	1.141	2.453+-	1.864
73	ZHKLD	*	2.115+-	1.210	3.225+-	2.044
74	CUKST	*	9.082+-	4.325	13.849+-	7.599

TOTAL:		51.979+-	7.481	79.263+-	24.434
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO				
1	AL *	2.784+-	1.214	4.246	3.119+-	0.308	1.120+-	0.166	AL
2	SI *	11.016+-	5.452	16.799	11.024+-	1.097	1.001+-	0.141	SI
3	P	0.129+-	0.033	0.197	0.109+-	0.008	0.845+-	0.080	P
4	S	1.508+-	0.472	2.300	1.045+-	0.062	0.693+-	0.050	S
5	CL	0.345+-	0.233	0.526	0.288+-	0.025	0.835+-	0.096	CL
6	K *	0.685+-	0.276	1.045	0.688+-	0.063	1.003+-	0.130	K
7	CA *	1.321+-	0.333	2.014	1.182+-	0.109	0.895+-	0.111	CA
8	TI *	0.143+-	0.066	0.219	0.153+-	0.015	1.066+-	0.152	TI
9	V	0.013+-	0.005	0.020	0.010+-	0.001	0.770+-	0.095	V
10	CR	0.012+-	0.005	0.019	0.011+-	0.001	0.922+-	0.104	CR
11	MN *	0.050+-	0.018	0.077	0.048+-	0.005	0.954+-	0.128	MN
12	FE *	1.646+-	0.603	2.510	1.802+-	0.176	1.095+-	0.158	FE
13	NI *	0.032+-	0.013	0.049	0.032+-	0.002	0.985+-	0.090	NI
14	CU *	5.775+-	3.088	8.806	6.010+-	0.503	1.041+-	0.126	CU
15	ZH *	1.825+-	0.747	2.783	1.852+-	0.140	1.015+-	0.109	ZH
16	AS *	0.310+-	0.175	0.473	0.314+-	0.025	1.013+-	0.114	AS
17	SE	0.010+-	0.004	0.015	0.012+-	0.001	1.208+-	0.146	SE
18	BR *	0.045+-	0.015	0.069	0.045+-	0.012	1.006+-	0.385	BR
19	SR	0.013+-	0.004	0.020	0.017+-	0.002	1.302+-	0.190	SR
20	PD	0.012+-	0.007	0.018	0.015+-	0.002	1.207+-	0.244	PD
21	AG	0.019+-	0.004	0.030	0.015+-	0.002	0.752+-	0.150	AG
22	CD *	0.190+-	0.122	0.290	0.205+-	0.017	1.075+-	0.130	CD
23	IN	0.009+-	0.005	0.014	0.003+-	0.003	0.338+-	0.363	IN
24	SN	0.038+-	0.012	0.057	0.037+-	0.004	0.986+-	0.163	SN
25	SB	0.056+-	0.029	0.086	0.065+-	0.009	1.161+-	0.236	SB
26	BA	0.099+-	0.042	0.152	0.024+-	0.018	0.243+-	0.187	BA
27	HG	0.006+-	0.002	0.009	0.006+-	0.001	1.053+-	0.222	HG
28	PB *	2.114+-	1.195	3.223	1.757+-	0.097	0.831+-	0.060	PB

MEAS. AMB. MASS (UG/M3): 65.6

* - FITTING ELEMENT



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CHSDED RESULTS FOR CMB # 0F4 3

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 4

ALL VALID SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.665 D OF F: 6

CODE SOURCE FLG UG/M3 %

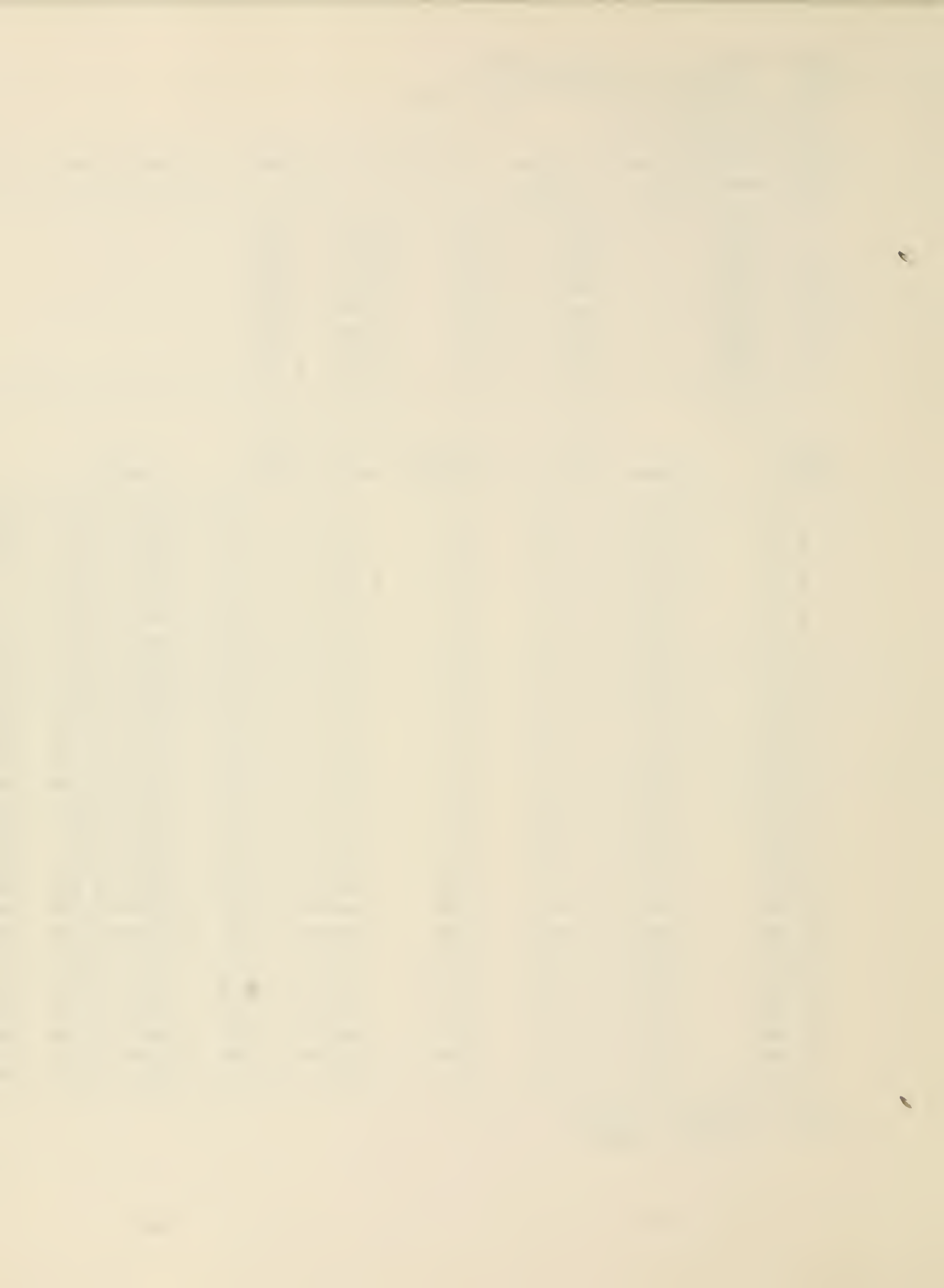
1	TRANS	*	0.274+- 0.118	2.437+- 1.075
14	GEO-L	*	3.814+- 0.572	33.914+- 6.103
63	HDBLD	*	0.928+- 0.832	8.249+- 7.446
65	DRBLD	*	0.184+- 0.064	1.632+- 0.589
67	BLFUP	*	0.867+- 0.238	7.708+- 2.249
73	ZNKLD	*	0.417+- 0.153	3.710+- 1.414
74	CUKST	*	0.359+- 0.147	3.193+- 1.349
77	SECSO	*	1.386+- 0.588	12.322+- 5.367

TOTAL: 8.228+- 1.218 73.165+-13.055

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.377+- 0.082	3.353	0.405+- 0.039	1.075+-0.152	AL	
2 SI *	1.116+- 0.260	9.926	1.171+- 0.113	1.049+-0.147	SI	
3 P	0.053+- 0.008	0.471	0.028+- 0.002	0.535+-0.040	P	
4 S *	0.692+- 0.121	6.155	0.692+- 0.040	1.000+-0.082	S	
5 CL	0.020+- 0.007	0.181	0.064+- 0.009	3.138+-1.442	CL	
6 K *	0.132+- 0.019	1.171	0.105+- 0.008	0.795+-0.073	K	
7 CA *	0.186+- 0.034	1.653	0.165+- 0.013	0.885+-0.096	CA	
8 TI *	0.015+- 0.004	0.134	0.016+- 0.001	1.033+-0.137	TI	
9 Y	0.001+- 0.001	0.012	0.001+- 0.000	0.605+-0.174	Y	
10 CR	0.000+- 0.000	0.004	0.002+- 0.000	4.425+-1.936	CR	
11 MN *	0.007+- 0.001	0.061	0.007+- 0.001	1.020+-0.117	MN	
12 FE *	0.181+- 0.039	1.613	0.221+- 0.019	1.216+-0.162	FE	
13 NI	0.003+- 0.001	0.027	0.003+- 0.000	1.078+-0.116	NI	
14 CU *	0.233+- 0.077	2.075	0.236+- 0.020	1.010+-0.120	CU	
15 ZH *	0.483+- 0.088	4.294	0.492+- 0.030	1.019+-0.089	ZH	
16 AS *	0.163+- 0.033	1.450	0.163+- 0.011	1.001+-0.097	AS	
17 SE	0.002+- 0.000	0.019	0.003+- 0.000	1.499+-0.211	SE	
18 BR *	0.023+- 0.002	0.202	0.023+- 0.007	1.026+-0.451	BR	
19 SR	0.001+- 0.001	0.009	0.002+- 0.000	1.956+-0.570	SR	
20 PD	0.001+- 0.001	0.003	0.008+- 0.001	9.999+-9.999	PD	
21 AG	0.003+- 0.002	0.024	0.005+- 0.001	2.030+-0.844	AG	
22 CD *	0.125+- 0.040	1.109	0.155+- 0.014	1.241+-0.184	CD	
23 IN	0.004+- 0.003	0.035	0.001+- 0.001	0.144+-0.377	IN	
24 SH	0.009+- 0.004	0.082	0.012+- 0.002	1.297+-0.344	SH	
25 SB	0.014+- 0.007	0.127	0.017+- 0.004	1.204+-0.450	SB	
26 BA	0.017+- 0.017	0.076	0.007+- 0.009	0.403+-0.582	BA	
27 HG	0.001+- 0.001	0.008	0.003+- 0.000	3.234+-1.402	HG	
28 PB *	0.817+- 0.231	7.264	0.659+- 0.041	0.806+-0.065	PB	

MEAS. AMB. MASS (UG/M3): 11.2

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF4 30

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.520 D OF F: 6

CODE SOURCE FLG UG/M3 %

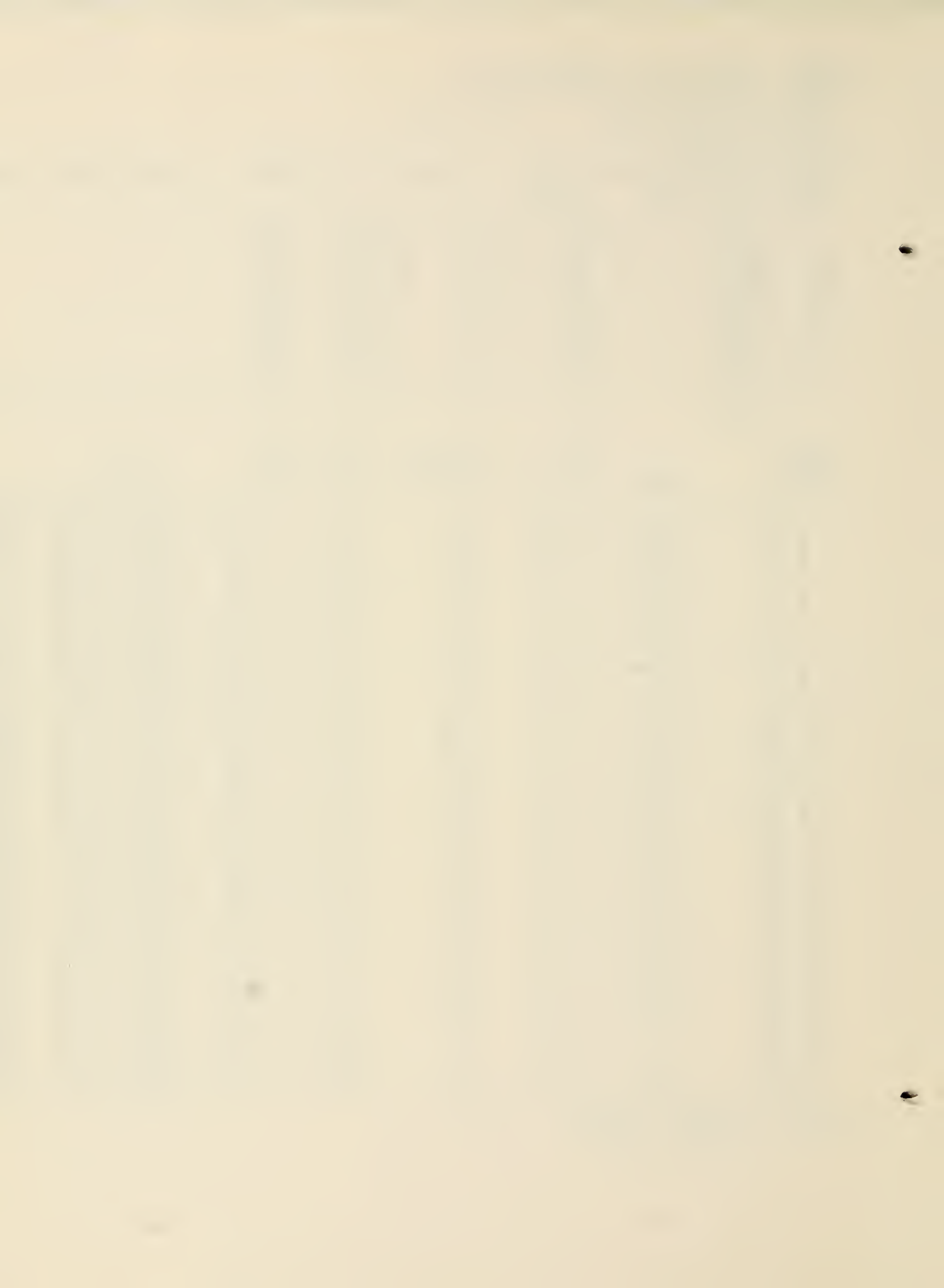
1	TRANS	*	0.269+-	0.116	2.539+-	1.128
14	GEO-L	*	3.489+-	0.568	32.945+-	6.272
63	HDBLD	*	0.730+-	0.792	3.756+-	7.511
65	DRBLD	*	0.180+-	0.071	1.699+-	0.691
67	BLFUP	*	0.867+-	0.263	8.188+-	2.608
73	ZHKLD	*	0.429+-	0.173	4.054+-	1.684
74	CUKST	*	0.293+-	0.144	2.770+-	1.386
77	SECSO	*	1.210+-	0.569	11.427+-	5.493

TOTAL: 7.467+- 1.188 70.518+-13.210

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.335+-	0.082	3.168	0.369+-	0.036	1.101+-0.158 AL
2 SI *	0.995+-	0.266	9.400	1.067+-	0.103	1.072+-0.152 SI
3 P	0.049+-	0.008	0.466	0.026+-	0.002	0.529+-0.038 P
4 S *	0.625+-	0.116	5.900	0.625+-	0.036	1.000+-0.082 S
5 CL	0.023+-	0.007	0.220	0.060+-	0.009	2.575+-1.053 CL
6 K *	0.122+-	0.019	1.149	0.097+-	0.007	0.794+-0.073 K
7 CA *	0.168+-	0.034	1.590	0.149+-	0.012	0.882+-0.097 CA
8 TI *	0.014+-	0.004	0.129	0.014+-	0.001	1.035+-0.137 TI
9 V	0.001+-	0.000	0.007	0.001+-	0.000	1.027+-0.361 V
10 CR	0.001+-	0.000	0.006	0.002+-	0.000	3.220+-1.070 CR
11 MH *	0.006+-	0.001	0.058	0.006+-	0.001	1.022+-0.118 MH
12 FE *	0.165+-	0.041	1.560	0.198+-	0.017	1.196+-0.160 FE
13 NI	0.002+-	0.001	0.024	0.003+-	0.000	1.183+-0.132 NI
14 CU *	0.193+-	0.076	1.825	0.195+-	0.016	1.011+-0.119 CU
15 ZN *	0.473+-	0.101	4.469	0.482+-	0.030	1.018+-0.091 ZN
16 AS *	0.158+-	0.038	1.488	0.158+-	0.011	1.000+-0.098 AS
17 SE	0.002+-	0.000	0.019	0.003+-	0.000	1.548+-0.219 SE
18 BR *	0.022+-	0.002	0.208	0.022+-	0.007	1.018+-0.454 BR
19 SR	0.001+-	0.001	0.004	0.002+-	0.000	2.184+-0.711 SR
20 PD	0.001+-	0.001	0.004	0.003+-	0.001	9.621+-9.628 PD
21 AG	0.003+-	0.002	0.029	0.005+-	0.001	1.639+-0.563 AG
22 CD *	0.123+-	0.047	1.163	0.153+-	0.014	1.242+-0.186 CD
23 IH	0.004+-	0.003	0.042	0.001+-	0.001	0.120+-0.298 IH
24 SH	0.007+-	0.004	0.066	0.011+-	0.002	1.636+-0.481 SH
25 SB	0.012+-	0.008	0.114	0.016+-	0.004	1.358+-0.526 SB
26 BA	<	0.001	---	0.006+-	0.008	0.000+-0.000 BA
27 HG	0.001+-	0.001	0.010	0.003+-	0.000	2.509+-0.841 HG
28 PB *	0.720+-	0.243	6.800	0.632+-	0.041	0.878+-0.075 PB

MEAS. AMB. MASS (UG/M3): 10.6

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF4 4

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

ALL VALID SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 5.739 D OF F: 7
CODE SOURCE FLG UG/M3 %

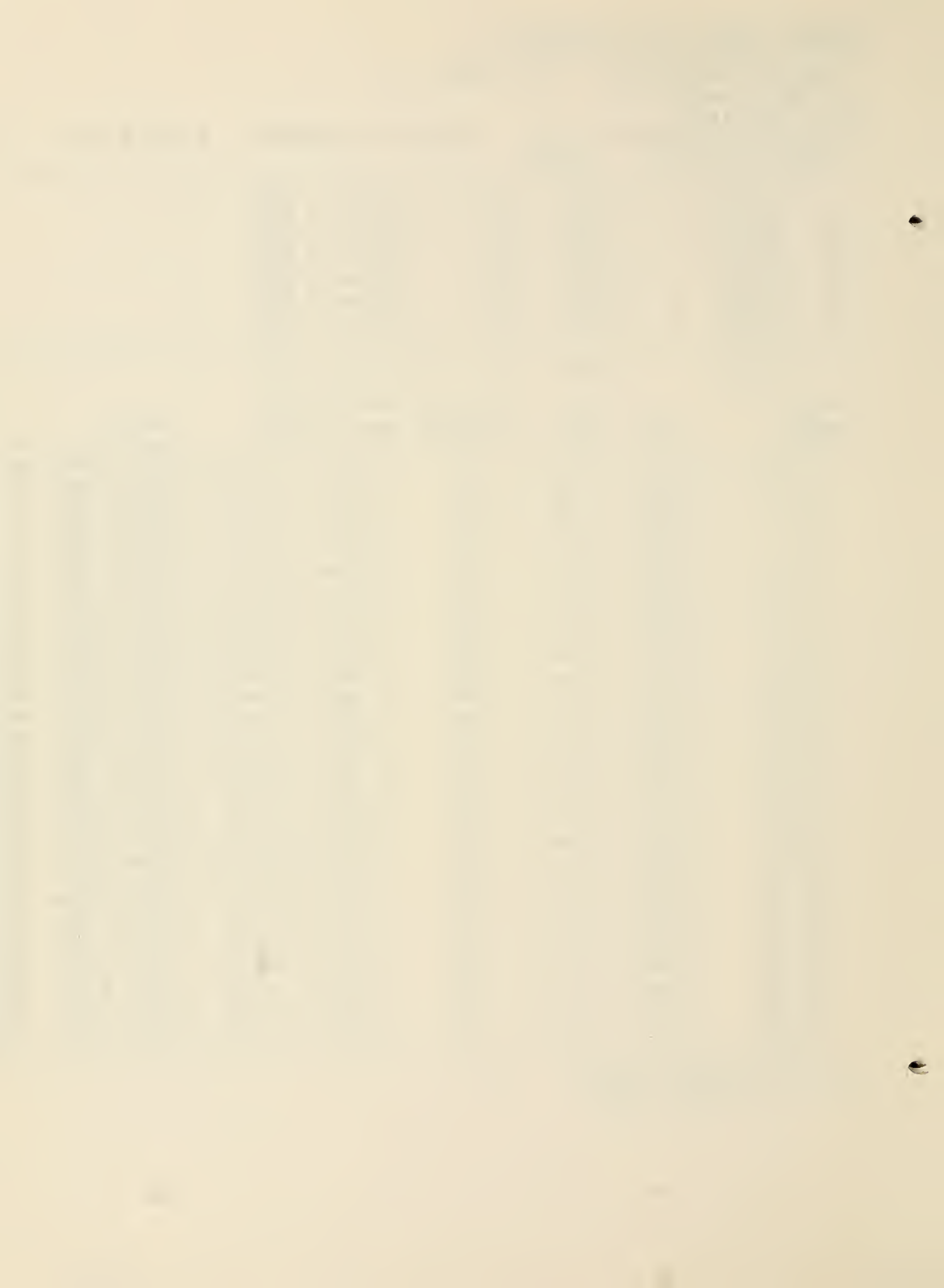
1	TRANS	*	0.404+-	0.155	2.719+-	1.089
13	GEO-K	*	1.966+-	0.144	13.215+-	1.853
65	DRBLD	*	0.120+-	0.034	0.804+-	0.248
67	BLFUP	*	0.633+-	0.100	4.255+-	0.843
73	ZHKLD	*	0.295+-	0.095	1.983+-	0.680
74	CUKST	*	0.270+-	0.074	1.815+-	0.545
77	SECSO	*	1.689+-	0.419	11.353+-	3.128

TOTAL: 5.376+- 0.496 36.142+- 5.459

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO	
1 AL *	0.219+-	0.051	1.472	0.163+-	0.017	0.772+-0.095 AL
2 SI *	0.437+-	0.048	2.940	0.489+-	0.048	1.118+-0.165 SI
3 P	0.050+-	0.006	0.334	0.013+-	0.001	0.263+-0.020 P
4 S *	0.622+-	0.090	4.181	0.622+-	0.044	1.000+-0.099 S
5 CL	0.065+-	0.011	0.434	0.040+-	0.007	0.626+-0.122 CL
6 K *	0.103+-	0.009	0.690	0.044+-	0.003	0.432+-0.032 K
7 CA *	0.096+-	0.012	0.643	0.113+-	0.010	1.181+-0.170 CA
8 TI *	0.006+-	0.001	0.039	0.007+-	0.001	1.171+-0.169 TI
9 V	0.001+-	0.000	0.005	0.001+-	0.000	0.755+-0.214 V
10 CR	0.001+-	0.000	0.004	0.001+-	0.000	1.072+-0.340 CR
11 MN *	0.004+-	0.000	0.026	0.004+-	0.000	0.948+-0.132 MN
12 FE *	0.087+-	0.010	0.588	0.089+-	0.009	1.018+-0.140 FE
13 NI	0.001+-	0.000	0.009	0.002+-	0.000	1.741+-0.280 NI
14 CU *	0.175+-	0.037	1.175	0.176+-	0.015	1.009+-0.121 CU
15 ZN *	0.334+-	0.054	2.244	0.347+-	0.022	1.039+-0.095 ZN
16 AS *	0.107+-	0.018	0.717	0.106+-	0.007	0.991+-0.097 AS
17 SE	0.001+-	0.000	0.009	0.002+-	0.000	1.612+-0.256 SE
18 BR *	0.031+-	0.003	0.207	0.030+-	0.011	0.962+-0.474 BR
19 SR	0.000+-	0.000	0.003	0.001+-	0.000	2.489+-1.269 SR
20 PD	0.002+-	0.001	0.015	0.006+-	0.001	2.447+-0.692 PD
21 AG	0.002+-	0.001	0.016	0.003+-	0.001	1.044+-0.458 AG
22 CD *	0.090+-	0.018	0.605	0.114+-	0.011	1.270+-0.189 CD
23 IN	0.003+-	0.001	0.019	0.000+-	0.001	0.112+-0.446 IN
24 SN	0.003+-	0.001	0.024	0.007+-	0.001	1.875+-0.881 SN
25 SB	0.009+-	0.003	0.062	0.010+-	0.003	1.139+-0.463 SB
26 BA	0.004+-	0.004	0.013	0.014+-	0.007	3.574+-6.638 BA
27 HG	0.001+-	0.000	0.009	0.002+-	0.000	1.411+-0.351 HG
28 PB *	0.434+-	0.060	2.918	0.471+-	0.032	1.086+-0.109 PB

MEAS. AMB. MASS (UG/M3): 14.9

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF4 4
 FINE PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 4
 ALL VALID SAMPLES
 SITE: HADFIELD

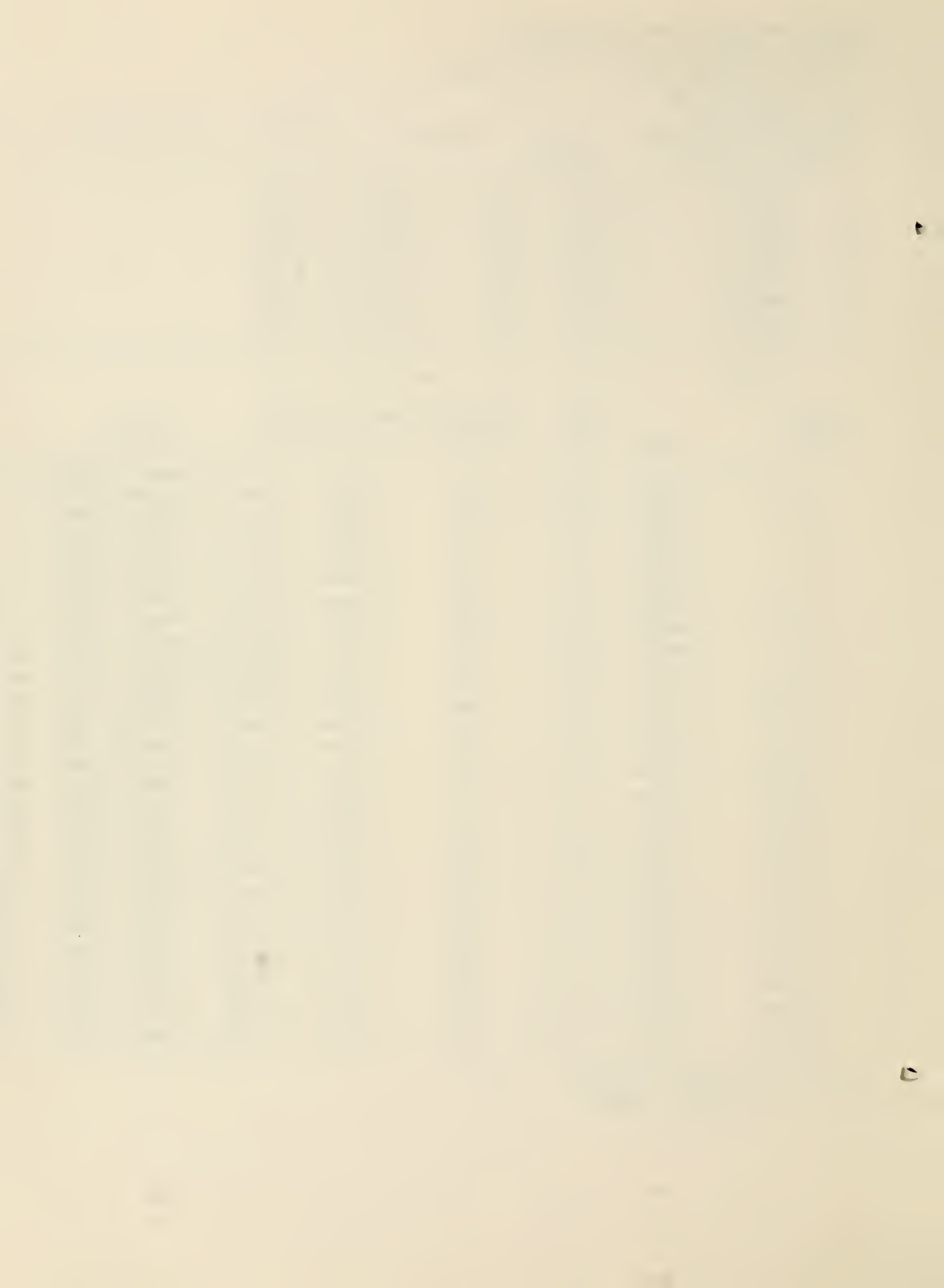
EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.478 D OF F: 6
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.452+- 0.168	3.037+- 1.187
13	GEO-K	*	1.783+- 0.144	11.983+- 1.729
65	ORBLD	*	0.128+- 0.034	0.859+- 0.252
67	BLFUP	*	0.508+- 0.099	3.416+- 0.779
73	ZHKLD	*	0.300+- 0.094	2.016+- 0.679
74	CUKST	*	0.270+- 0.074	1.816+- 0.545
77	SECSO	*	1.693+- 0.418	11.380+- 3.120
79	WSTOV	*	19.632+- 3.341	131.975+-27.451

TOTAL: 24.765+- 3.378 166.482+-30.201

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.219+- 0.051	1.472	0.163+- 0.015	0.746+-0.086	AL	
2 SI *	0.437+- 0.048	2.940	0.451+- 0.044	1.031+-0.144	SI	
3 P	0.050+- 0.006	0.334	0.018+- 0.001	0.367+-0.022	P	
4 S *	0.622+- 0.090	4.181	0.622+- 0.043	1.000+-0.098	S	
5 CL	0.065+- 0.011	0.434	0.046+- 0.006	0.710+-0.107	CL	
6 K *	0.103+- 0.009	0.690	0.102+- 0.004	0.997+-0.059	K	
7 CA *	0.096+- 0.012	0.643	0.108+- 0.010	1.132+-0.155	CA	
8 TI *	0.006+- 0.001	0.039	0.006+- 0.001	1.096+-0.156	TI	
9 V	0.001+- 0.000	0.005	0.000+- 0.000	0.691+-0.390	V	
10 CR	0.001+- 0.000	0.004	0.001+- 0.000	0.972+-0.543	CR	
11 MN *	0.004+- 0.000	0.026	0.003+- 0.000	0.888+-0.144	MN	
12 FE *	0.087+- 0.010	0.588	0.081+- 0.008	0.929+-0.122	FE	
13 NI	0.001+- 0.000	0.009	0.002+- 0.000	1.664+-0.369	NI	
14 CU *	0.175+- 0.037	1.175	0.174+- 0.015	0.994+-0.120	CU	
15 ZN *	0.334+- 0.054	2.244	0.337+- 0.022	1.008+-0.092	ZN	
16 AS *	0.107+- 0.018	0.717	0.106+- 0.008	0.998+-0.102	AS	
17 SE	0.001+- 0.000	0.009	0.002+- 0.000	1.688+-0.387	SE	
18 BR *	0.031+- 0.003	0.207	0.033+- 0.012	1.071+-0.559	BR	
19 SR	0.000+- 0.000	0.003	0.001+- 0.000	2.213+-1.575	SR	
20 PD	0.002+- 0.001	0.015	0.005+- 0.001	2.341+-0.761	PD	
21 AG	0.002+- 0.001	0.016	0.002+- 0.001	0.979+-0.610	AG	
22 CD *	0.090+- 0.018	0.605	0.093+- 0.009	1.034+-0.136	CD	
23 IN	0.003+- 0.001	0.019	0.000+- 0.002	0.100+-0.585	IN	
24 SH	0.003+- 0.001	0.024	0.006+- 0.002	1.641+-1.041	SH	
25 SB	0.009+- 0.003	0.062	0.010+- 0.003	1.135+-0.560	SB	
26 BA	0.004+- 0.004	0.013	0.012+- 0.009	3.221+-7.811	BA	
27 HG	0.001+- 0.000	0.009	0.002+- 0.000	1.417+-0.398	HG	
28 PB *	0.434+- 0.060	2.918	0.418+- 0.028	0.963+-0.089	PB	

MEAS. AMB. MASS (UG/M3): 14.9
 * - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF4 40

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 6.113 D OF F: 7

CODE SOURCE FLG UG/M3 %

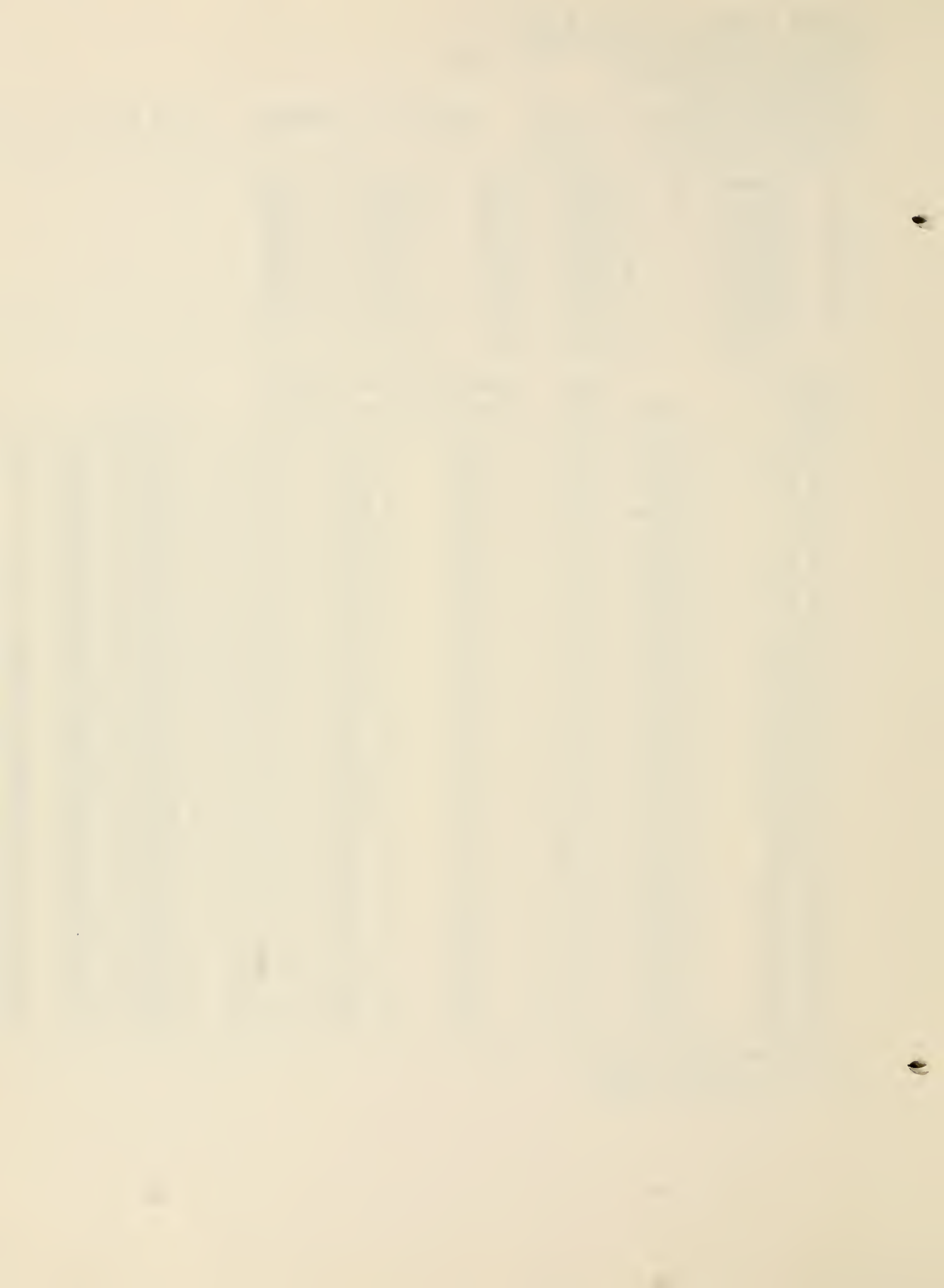
1	TRANS	*	0.406+- 0.156	2.619+- 1.055
13	GEO-K	*	1.996+- 0.148	12.892+- 1.812
65	DRBLD	*	0.123+- 0.036	0.792+- 0.250
67	BLFUP	*	0.683+- 0.105	4.412+- 0.860
73	ZNKLD	*	0.290+- 0.099	1.875+- 0.679
74	CUKST	*	0.281+- 0.079	1.812+- 0.552
77	SECSO	*	1.753+- 0.439	11.320+- 3.140

TOTAL:	5.532+- 0.517	35.722+- 5.419
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC	UG/M3	RATIO	
1 AL *	0.224+- 0.054	1.445	0.172+- 0.017	0.767+- 0.094	AL		
2 SI *	0.447+- 0.050	2.885	0.497+- 0.049	1.112+- 0.164	SI		
3 P	0.052+- 0.006	0.333	0.014+- 0.001	0.265+- 0.020	P		
4 S *	0.649+- 0.094	4.190	0.649+- 0.045	1.000+- 0.099	S		
5 CL	0.059+- 0.009	0.379	0.043+- 0.007	0.728+- 0.151	CL		
6 K *	0.107+- 0.009	0.692	0.046+- 0.003	0.429+- 0.032	K		
7 CA *	0.098+- 0.013	0.635	0.115+- 0.011	1.169+- 0.167	CA		
8 TI *	0.006+- 0.001	0.037	0.007+- 0.001	1.191+- 0.174	TI		
9 V	0.001+- 0.000	0.005	0.001+- 0.000	0.670+- 0.182	V		
10 CR	0.001+- 0.000	0.004	0.001+- 0.000	1.099+- 0.351	CR		
11 MH *	0.004+- 0.000	0.024	0.004+- 0.000	0.987+- 0.140	MH		
12 FE *	0.089+- 0.011	0.577	0.090+- 0.009	1.012+- 0.139	FE		
13 NI	0.001+- 0.000	0.009	0.003+- 0.000	1.786+- 0.291	NI		
14 CU *	0.181+- 0.040	1.166	0.183+- 0.015	1.011+- 0.122	CU		
15 ZH *	0.335+- 0.057	2.165	0.350+- 0.022	1.043+- 0.095	ZH		
16 AS *	0.110+- 0.019	0.712	0.109+- 0.008	0.990+- 0.097	AS		
17 SE	0.001+- 0.000	0.009	0.002+- 0.000	1.517+- 0.230	SE		
18 BR *	0.032+- 0.003	0.204	0.030+- 0.011	0.942+- 0.459	BR		
19 SR	0.000+- 0.000	0.003	0.001+- 0.000	2.565+- 1.332	SR		
20 PD	0.002+- 0.001	0.015	0.006+- 0.001	2.443+- 0.679	PD		
21 AG	0.003+- 0.001	0.017	0.003+- 0.001	1.005+- 0.422	AG		
22 CD *	0.095+- 0.019	0.613	0.123+- 0.011	1.294+- 0.196	CD		
23 IN	0.003+- 0.001	0.019	0.000+- 0.001	0.110+- 0.423	IN		
24 SN	0.004+- 0.002	0.025	0.007+- 0.001	1.806+- 0.804	SN		
25 SB	0.002+- 0.003	0.055	0.011+- 0.003	1.269+- 0.543	SB		
26 BA	0.004+- 0.004	0.013	0.014+- 0.007	3.379+- 5.933	BA		
27 HG	0.001+- 0.000	0.008	0.002+- 0.000	1.577+- 0.418	HG		
28 PB *	0.453+- 0.063	2.924	0.494+- 0.034	1.092+- 0.111	PB		

MEAS. AMB. MASS (UG/M3): 15.5

* - FITTING ELEMENT



CHBDED RESULTS FOR CHB # QF4 40

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.429 D OF F: 6

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.458+-	0.171	2.960+-	1.161
13	GEO-K	*	1.801+-	0.148	11.630+-	1.687
65	DRBLD	*	0.132+-	0.036	0.853+-	0.254
67	BLFUP	*	0.541+-	0.104	3.493+-	0.788
73	ZNKLD	*	0.296+-	0.099	1.911+-	0.678
74	CUKST	*	0.280+-	0.079	1.810+-	0.552
77	SECSO	*	1.766+-	0.437	11.406+-	3.135
79	USTOY	*	20.687+-	3.400	133.596+-	27.149

TOTAL: 25.962+- 3.439 167.658+-29.915

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO		
1 AL *	0.224+-	0.054	1.445	0.165+-	0.015	0.739+-0.084	AL
2 SI *	0.447+-	0.050	2.885	0.456+-	0.044	1.020+-0.141	SI
3 P	0.052+-	0.006	0.333	0.019+-	0.001	0.368+-0.022	P
4 S *	0.649+-	0.094	4.190	0.649+-	0.045	1.000+-0.098	S
5 CL	0.059+-	0.009	0.379	0.048+-	0.006	0.819+-0.131	CL
6 K *	0.107+-	0.009	0.692	0.107+-	0.004	0.998+-0.059	K
7 CA *	0.098+-	0.013	0.635	0.110+-	0.010	1.117+-0.151	CA
8 TI *	0.006+-	0.001	0.037	0.006+-	0.001	1.111+-0.160	TI
9 V	0.001+-	0.000	0.005	0.000+-	0.000	0.610+-0.343	V
10 CR	0.001+-	0.000	0.004	0.001+-	0.000	0.990+-0.570	CR
11 MN *	0.004+-	0.000	0.024	0.003+-	0.000	0.922+-0.153	MN
12 FE *	0.089+-	0.011	0.577	0.082+-	0.008	0.919+-0.120	FE
13 NI	0.001+-	0.000	0.009	0.002+-	0.000	1.701+-0.389	NI
14 CU *	0.181+-	0.040	1.166	0.180+-	0.015	0.994+-0.120	CU
15 ZH *	0.335+-	0.057	2.165	0.338+-	0.022	1.008+-0.091	ZH
16 AS *	0.110+-	0.019	0.712	0.110+-	0.008	0.998+-0.102	AS
17 SE	0.001+-	0.000	0.009	0.002+-	0.000	1.588+-0.356	SE
18 BR *	0.032+-	0.003	0.204	0.033+-	0.012	1.060+-0.550	BR
19 SR	0.000+-	0.000	0.003	0.001+-	0.000	2.261+-1.664	SR
20 PD	0.002+-	0.001	0.015	0.006+-	0.001	2.329+-0.749	PD
21 AG	0.003+-	0.001	0.017	0.002+-	0.001	0.937+-0.571	AG
22 CD *	0.095+-	0.019	0.613	0.099+-	0.009	1.039+-0.138	CD
23 IH	0.003+-	0.001	0.019	0.000+-	0.002	0.097+-0.564	IH
24 SH	0.004+-	0.002	0.025	0.006+-	0.002	1.563+-0.958	SH
25 SB	0.008+-	0.003	0.055	0.011+-	0.004	1.265+-0.666	SB
26 BA	0.004+-	0.004	0.013	0.012+-	0.009	3.026+-7.065	BA
27 HG	0.001+-	0.000	0.008	0.002+-	0.000	1.576+-0.476	HG
28 PB *	0.453+-	0.063	2.924	0.434+-	0.029	0.958+-0.089	PB

MEAS. AMB. MASS (UG/M3): 15.5

* - FITTING ELEMENT

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CMBDER RESULTS FOR CMB # Q04.3

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 4

ALL VALID SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.190 D OF F: 8

CODE SOURCE FLG UG/M3 %

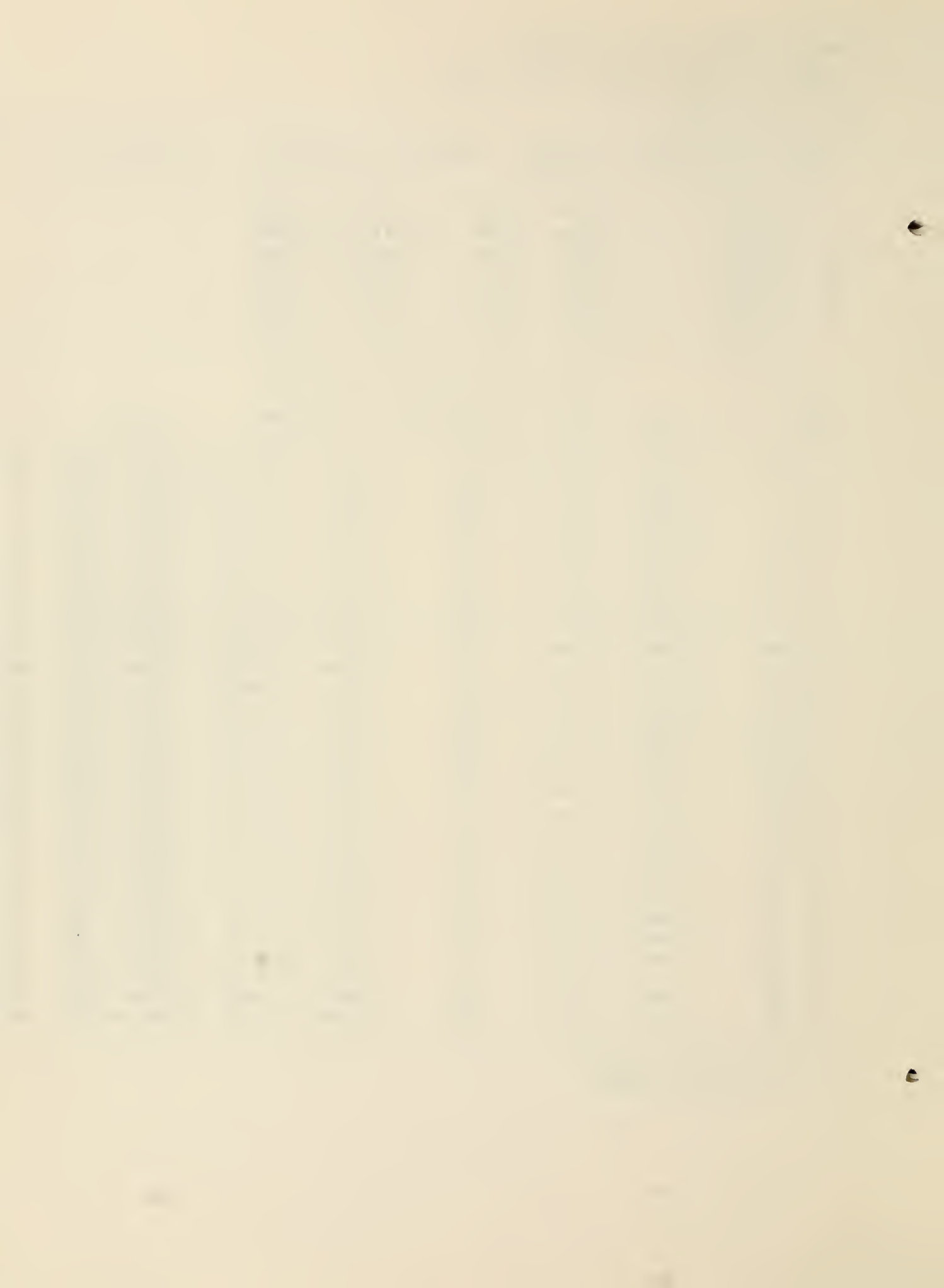
1	TRANS	*	0.041+-	0.023	0.283+-	0.179
14	GEO-L	*	11.012+-	1.460	76.474+-	23.388
63	NDBLD	*	1.449+-	0.691	10.064+-	5.555
65	DRBLD	*	0.092+-	0.069	0.637+-	0.511
73	ZNKLD	*	0.143+-	0.123	0.993+-	0.895
74	CUKST	*	0.866+-	0.508	6.011+-	3.904

TOTAL:			13.603+-	1.699	94.463+-	28.833
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SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC.	UG/M3	RATIO	
1 AL *	0.927+-	0.264	6.436	0.940+-	0.093	1.015+-	0.143 AL
2 SI *	3.337+-	1.015	23.176	3.141+-	0.311	0.941+-	0.128 SI
3 P	0.042+-	0.010	0.293	0.030+-	0.003	0.707+-	0.075 P
4 S	0.263+-	0.060	1.826	0.244+-	0.021	0.927+-	0.107 S
5 CL	0.019+-	0.009	0.130	0.032+-	0.003	1.702+-	0.268 CL
6 K *	0.217+-	0.060	1.508	0.224+-	0.022	1.031+-	0.144 K
7 CA *	0.558+-	0.133	3.877	0.413+-	0.038	0.740+-	0.084 CA
8 TI *	0.046+-	0.013	0.323	0.051+-	0.007	1.098+-	0.210 TI
9 V	0.003+-	0.001	0.018	0.003+-	0.000	1.095+-	0.189 V
10 CR	0.003+-	0.001	0.024	0.005+-	0.000	1.495+-	0.198 CR
11 MN *	0.019+-	0.006	0.131	0.020+-	0.002	1.049+-	0.128 MN
12 FE *	0.575+-	0.175	3.990	0.651+-	0.058	1.134+-	0.152 FE
13 NI	0.004+-	0.001	0.031	0.005+-	0.000	1.197+-	0.121 NI
14 CU *	0.669+-	0.269	4.648	0.673+-	0.050	1.005+-	0.106 CU
15 ZN *	0.285+-	0.069	1.982	0.286+-	0.017	1.002+-	0.086 ZN
16 AS *	0.051+-	0.012	0.353	0.051+-	0.003	1.006+-	0.082 AS
17 SE	0.001+-	0.000	0.005	0.002+-	0.000	2.176+-	0.450 SE
18 BR *	0.006+-	0.001	0.042	0.006+-	0.001	1.000+-	0.257 BR
19 SR	0.006+-	0.002	0.040	0.006+-	0.000	1.088+-	0.126 SR
20 PD	0.002+-	0.001	0.015	0.002+-	0.001	0.849+-	0.340 PD
21 AG	0.003+-	0.003	0.010	0.005+-	0.001	1.834+-	0.788 AG
22 CD *	0.014+-	0.006	0.100	0.015+-	0.002	1.072+-	0.187 CD
23 IN	0.002+-	0.002	0.009	0.000+-	0.001	0.153+-	0.580 IN
24 SN	0.004+-	0.004	0.014	0.010+-	0.002	2.684+-	1.361 SN
25 SB *	0.025+-	0.010	0.173	0.022+-	0.004	0.899+-	0.205 SB
26 BA	<	0.001	---	0.001+-	0.008	0.000+-	0.000 BA
27 HG	0.002+-	0.001	0.012	0.001+-	0.000	0.877+-	0.269 HG
28 PB *	0.433+-	0.106	3.008	0.429+-	0.028	0.991+-	0.090 PB

MEAS. AMB. MASS (UG/M3): 14.4

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # 004.30

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING: REDUCED CHI SQUARE: 0.157 D OF F: 2
CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.042+-	0.025	0.321+-	0.216
14	GEO-L	*	9.906+-	1.514	75.579+-	27.792
63	NDBLD	*	1.098+-	0.683	8.379+-	5.915
65	DRBLD	*	0.091+-	0.073	0.697+-	0.602
73	ZHKLD	*	0.149+-	0.132	1.140+-	1.080
74	CUKST	*	0.824+-	0.573	6.285+-	4.849

TOTAL: 12.111+- 1.764 92.400+-33.705

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.812+-	0.274	6.194	0.845+-	0.084	1.041+-0.149 AL
2 SI *	2.959+-	1.088	22.577	2.923+-	0.280	0.954+-0.131 SI
3 P	0.039+-	0.011	0.296	0.027+-	0.002	0.685+-0.072 P
4 S	0.232+-	0.059	1.770	0.214+-	0.017	0.922+-0.101 S
5 CL	0.011+-	0.006	0.085	0.029+-	0.002	2.625+-0.587 CL
6 K *	0.188+-	0.060	1.438	0.201+-	0.020	1.067+-0.152 K
7 CA *	0.501+-	0.139	3.824	0.368+-	0.034	0.734+-0.084 CA
8 TI *	0.044+-	0.015	0.333	0.046+-	0.006	1.046+-0.183 TI
9 V	0.002+-	0.001	0.015	0.003+-	0.000	1.277+-0.242 V
10 CR	0.003+-	0.001	0.025	0.004+-	0.000	1.363+-0.173 CR
11 MN *	0.017+-	0.006	0.130	0.017+-	0.001	1.016+-0.124 MN
12 FE *	0.503+-	0.185	3.840	0.575+-	0.052	1.143+-0.156 FE
13 NI	0.004+-	0.002	0.031	0.005+-	0.000	1.161+-0.114 NI
14 CU *	0.619+-	0.306	4.719	0.627+-	0.047	1.013+-0.109 CU
15 ZN *	0.263+-	0.076	2.008	0.263+-	0.016	0.998+-0.087 ZN
16 AS *	0.046+-	0.013	0.355	0.047+-	0.003	1.001+-0.083 AS
17 SE	0.000+-	0.000	0.004	0.001+-	0.000	2.831+-0.721 SE
18 BR *	0.006+-	0.001	0.043	0.006+-	0.001	1.000+-0.277 BR
19 SR	0.005+-	0.001	0.035	0.005+-	0.000	1.169+-0.144 SR
20 PD	0.001+-	0.001	0.004	0.002+-	0.001	1.741+-1.137 PD
21 AG	0.003+-	0.003	0.012	0.004+-	0.001	1.343+-0.491 AG
22 CD *	0.013+-	0.007	0.102	0.013+-	0.002	0.963+-0.167 CD
23 IN	0.003+-	0.003	0.011	0.000+-	0.001	0.123+-0.464 IN
24 SN	0.004+-	0.004	0.017	0.009+-	0.002	2.111+-0.883 SN
25 SB	0.021+-	0.010	0.157	0.019+-	0.003	0.919+-0.222 SB
26 BA	<	0.001	---	0.001+-	0.007	0.000+-0.000 BA
27 HG	0.000+-	0.000	0.002	0.001+-	0.000	2.597+-1.707 HG
28 PB *	0.360+-	0.088	2.745	0.362+-	0.023	1.007+-0.091 PB

MEAS. AMB. MASS (UG/M3): 13.1

* - FITTING ELEMENT

CHBDED RESULTS FOR CHB # RC4 4

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

ALL VALID SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.227 0 OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.053+-	0.027	0.384+-	0.203
13	GEO-K	*	10.269+-	0.677	75.034+-	11.348
67	BLFUP	*	0.226+-	0.096	1.653+-	0.736
73	ZHKLD	*	0.121+-	0.104	0.885+-	0.769
74	CUKST	*	0.285+-	0.256	2.084+-	1.889

TOTAL: 10.954+- 0.737 80.039+-12.155

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO		
1 AL *	0.646+-	0.092	4.722	0.681+-	0.068	1.054+-0.153	AL
2 SI *	2.225+-	0.308	16.260	2.365+-	0.236	1.063+-0.155	SI
3 P	0.029+-	0.003	0.210	0.023+-	0.002	0.816+-0.095	P
4 S	0.285+-	0.038	2.080	0.228+-	0.019	0.799+-0.084	S
5 CL	0.022+-	0.005	0.159	0.016+-	0.002	0.736+-0.134	CL
6 K *	0.174+-	0.025	1.271	0.158+-	0.015	0.907+-0.119	K
7 CA *	0.548+-	0.079	4.006	0.541+-	0.054	0.987+-0.138	CA
8 TI *	0.034+-	0.005	0.249	0.038+-	0.004	1.111+-0.165	TI
9 V	0.003+-	0.000	0.019	0.002+-	0.000	0.876+-0.158	V
10 CR	0.004+-	0.001	0.028	0.003+-	0.000	0.659+-0.095	CR
11 MN *	0.017+-	0.003	0.122	0.016+-	0.002	0.953+-0.131	MN
12 FE *	0.470+-	0.072	3.438	0.463+-	0.046	0.984+-0.137	FE
13 HI	0.004+-	0.001	0.028	0.004+-	0.000	1.094+-0.131	HI
14 CU *	0.552+-	0.129	4.031	0.552+-	0.042	1.000+-0.109	CU
15 ZN *	0.297+-	0.059	2.170	0.305+-	0.021	1.029+-0.102	ZN
16 AS *	0.045+-	0.007	0.330	0.038+-	0.003	0.838+-0.096	AS
17 SE	0.001+-	0.000	0.007	0.001+-	0.000	1.142+-0.321	SE
18 BR *	0.007+-	0.001	0.054	0.007+-	0.001	1.001+-0.271	BR
19 SR	0.005+-	0.001	0.034	0.004+-	0.000	0.877+-0.114	SR
20 PD	0.001+-	0.000	0.009	0.001+-	0.001	0.971+-0.718	PD
21 AG	0.004+-	0.001	0.031	0.003+-	0.001	0.769+-0.332	AG
22 CD *	0.032+-	0.007	0.233	0.033+-	0.003	1.039+-0.119	CD
23 IN	0.002+-	0.001	0.014	0.000+-	0.002	0.057+-0.866	IN
24 SN	0.008+-	0.002	0.060	0.008+-	0.002	0.934+-0.327	SN
25 SB	0.016+-	0.004	0.119	0.017+-	0.004	1.049+-0.348	SB
26 BA	0.007+-	0.005	0.053	0.000+-	0.009	0.005+-1.187	BA
27 HG	0.001+-	0.000	0.011	0.001+-	0.000	0.509+-0.309	HG
28 PB *	0.403+-	0.065	2.945	0.403+-	0.032	1.000+-0.112	PB

MEAS. AMB. MASS (UG/M3): 13.7

* - FITTING ELEMENT

CM8DEQ RESULTS FOR CM8 # 004-40

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.213 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.055+-	0.029	0.388+-	0.208
13	GEO-K	*	10.664+-	0.710	75.146+-	11.524
67	BLFUP	*	0.232+-	0.101	1.632+-	0.746
73	ZNKLD	*	0.117+-	0.110	0.821+-	0.787
74	CUKST	*	0.305+-	0.271	2.147+-	1.932

TOTAL: 11.372+- 0.775 80.135+-12.344

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC	UG/M3	RATIO
1 AL *	0.672+-	0.096	4.736	0.707+-	0.070	1.053+-0.152 AL
2 SI *	2.306+-	0.323	16.249	2.456+-	0.245	1.065+-0.155 SI
3 P	0.030+-	0.004	0.210	0.024+-	0.002	0.818+-0.096 P
4 S	0.293+-	0.040	2.068	0.236+-	0.019	0.804+-0.085 S
5 CL	0.021+-	0.005	0.146	0.017+-	0.002	0.805+-0.151 CL
6 K *	0.181+-	0.026	1.273	0.164+-	0.016	0.906+-0.119 K
7 CA *	0.569+-	0.084	4.013	0.562+-	0.056	0.987+-0.138 CA
8 TI *	0.035+-	0.005	0.249	0.039+-	0.004	1.111+-0.165 TI
9 V	0.003+-	0.001	0.020	0.002+-	0.000	0.844+-0.150 V
10 CR	0.004+-	0.001	0.028	0.003+-	0.000	0.667+-0.096 CR
11 MN *	0.017+-	0.003	0.123	0.017+-	0.002	0.950+-0.130 MN
12 FE *	0.489+-	0.076	3.447	0.481+-	0.048	0.983+-0.137 FE
13 NI	0.004+-	0.001	0.029	0.004+-	0.000	1.022+-0.129 NI
14 CU *	0.577+-	0.137	4.070	0.577+-	0.044	1.000+-0.108 CU
15 ZH *	0.302+-	0.063	2.128	0.311+-	0.022	1.030+-0.104 ZH
16 AS *	0.046+-	0.008	0.326	0.039+-	0.003	0.846+-0.097 AS
17 SE	0.001+-	0.000	0.007	0.001+-	0.000	1.151+-0.334 SE
18 BR *	0.008+-	0.001	0.054	0.008+-	0.001	1.001+-0.273 BR
19 SR	0.005+-	0.001	0.034	0.004+-	0.000	0.892+-0.116 SR
20 PD	0.001+-	0.000	0.008	0.001+-	0.001	1.003+-0.758 PD
21 AG	0.005+-	0.001	0.032	0.003+-	0.001	0.745+-0.319 AG
22 CD *	0.033+-	0.008	0.231	0.034+-	0.003	1.041+-0.120 CD
23 IH	0.002+-	0.001	0.015	0.000+-	0.002	0.051+-0.814 IH
24 SH	0.008+-	0.003	0.055	0.008+-	0.002	1.014+-0.371 SH
25 SB	0.016+-	0.004	0.116	0.018+-	0.004	1.080+-0.364 SB
26 BA	0.008+-	0.005	0.054	0.000+-	0.009	0.005+-1.152 BA
27 HG	0.002+-	0.000	0.011	0.001+-	0.000	0.491+-0.299 HG
28 PB *	0.420+-	0.069	2.959	0.417+-	0.033	0.992+-0.112 PB

MEAS. AMB. MASS (UG/M3): 14.2

* - FITTING ELEMENT

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CMBDEQ RESULTS FOR CMB # 074.3

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 4

ALL VALID SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.883 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.472+-	0.217	0.861+-	0.416
14	GEO-L	*	32.113+-	2.715	58.531+-	10.025
63	NDBLD	*	2.833+-	1.621	5.163+-	3.054
65	DRBLD	*	0.819+-	0.375	1.493+-	0.719
67	BLFUP	*	1.202+-	0.449	2.191+-	0.881
73	ZNKLD	*	0.893+-	0.417	1.628+-	0.797
74	CUKST	*	2.895+-	1.177	5.277+-	2.284

TOTAL:			41.229+-	3.457	75.144+-	12.845

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	2.438+-	0.351	4.444	2.636+-	0.261	1.081+-0.157 AL
2 SI *	8.792+-	1.289	16.025	9.359+-	0.930	1.064+-0.154 SI
3 P	0.124+-	0.016	0.226	0.089+-	0.007	0.720+-0.066 P
4 S	1.091+-	0.147	1.989	0.732+-	0.049	0.671+-0.054 S
5 CL	0.048+-	0.015	0.088	0.138+-	0.014	2.839+-0.873 CL
6 K *	0.607+-	0.077	1.107	0.575+-	0.053	0.947+-0.121 K
7 CA *	1.683+-	0.253	3.068	1.058+-	0.093	0.629+-0.065 CA
8 TI *	0.131+-	0.020	0.238	0.131+-	0.013	1.003+-0.137 TI
9 V	0.010+-	0.002	0.018	0.009+-	0.001	0.911+-0.115 V
10 CR	0.011+-	0.002	0.021	0.014+-	0.001	1.206+-0.127 CR
11 MN *	0.053+-	0.009	0.097	0.054+-	0.004	1.005+-0.111 MN
12 FE *	1.609+-	0.254	2.933	1.778+-	0.151	1.105+-0.140 FE
13 NI *	0.018+-	0.004	0.033	0.019+-	0.001	1.031+-0.079 NI
14 CU *	2.581+-	0.772	4.705	2.567+-	0.181	0.995+-0.099 CU
15 ZN *	1.178+-	0.233	2.147	1.176+-	0.069	0.998+-0.082 ZN
16 AS *	0.318+-	0.083	0.580	0.318+-	0.025	1.000+-0.113 AS
17 SE	0.004+-	0.001	0.007	0.008+-	0.001	1.925+-0.276 SE
18 BR *	0.042+-	0.007	0.077	0.042+-	0.012	1.002+-0.412 BR
19 SR	0.017+-	0.003	0.031	0.019+-	0.001	1.118+-0.122 SR
20 PD	0.006+-	0.002	0.011	0.015+-	0.002	2.533+-0.720 PD
21 AG	0.007+-	0.003	0.014	0.019+-	0.002	2.576+-0.770 AG
22 CD *	0.178+-	0.041	0.324	0.178+-	0.013	1.000+-0.102 CD
23 IN	0.011+-	0.005	0.021	0.003+-	0.003	0.248+-0.234 IN
24 SN	0.041+-	0.007	0.075	0.035+-	0.004	0.849+-0.112 SN
25 SB	0.085+-	0.021	0.155	0.083+-	0.008	0.978+-0.133 SB
26 BA	0.077+-	0.024	0.140	0.025+-	0.014	0.324+-0.192 BA
27 HG	0.005+-	0.002	0.010	0.006+-	0.001	1.117+-0.213 HG
28 PB *	1.958+-	0.415	3.569	1.984+-	0.100	1.013+-0.073 PB

MEAS. AMB. MASS (UG/M3): 54.9

* - FITTING ELEMENT

CMSDEQ RESULTS FOR CMS # QT4 30

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.474 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.390+-	0.181	0.894+-	0.440
14	GEO-L	*	28.826+-	3.095	66.146+-	12.933
63	NDBLD	*	1.487+-	1.455	3.413+-	3.386
65	DRBLD	*	0.544+-	0.235	1.249+-	0.577
67	BLFUP	*	0.902+-	0.322	2.069+-	0.812
73	ZNKLD	*	0.733+-	0.439	1.682+-	1.044
74	CUKST	*	1.843+-	1.110	4.229+-	2.640

TOTAL:	34	725+-	3.649	79.682+-	15.480
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	2.135+-	0.458	4.898	2.358+-	0.234	1.105+-0.163 AL
2 SI *	7.801+-	1.715	17.902	8.381+-	0.834	1.074+-0.157 SI
3 P	0.104+-	0.019	0.239	0.074+-	0.006	0.711+-0.069 P
4 S	0.919+-	0.149	2.109	0.553+-	0.036	0.602+-0.045 S
5 CL	0.044+-	0.021	0.101	0.098+-	0.010	2.225+-0.575 CL
6 K *	0.528+-	0.092	1.211	0.508+-	0.048	0.962+-0.126 K
7 CA *	1.389+-	0.277	3.188	0.906+-	0.083	0.652+-0.071 CA
8 TI *	0.119+-	0.029	0.273	0.116+-	0.011	0.977+-0.133 TI
9 V	0.010+-	0.003	0.023	0.008+-	0.001	0.779+-0.094 V
10 CR	0.010+-	0.002	0.023	0.010+-	0.001	1.037+-0.108 CR
11 MH *	0.042+-	0.010	0.096	0.043+-	0.004	1.031+-0.124 MH
12 FE *	1.355+-	0.313	3.109	1.494+-	0.134	1.103+-0.147 FE
13 NI *	0.013+-	0.004	0.031	0.014+-	0.001	1.043+-0.085 NI
14 CU *	1.902+-	0.718	4.365	1.861+-	0.128	0.978+-0.094 CU
15 ZH *	0.929+-	0.252	2.132	0.927+-	0.056	0.998+-0.086 ZH
16 AS *	0.222+-	0.051	0.509	0.222+-	0.017	1.000+-0.109 AS
17 SE	0.002+-	0.002	0.006	0.006+-	0.000	2.477+-0.474 SE
18 BR *	0.035+-	0.006	0.080	0.035+-	0.010	1.001+-0.412 BR
19 SR	0.015+-	0.004	0.034	0.015+-	0.001	1.020+-0.115 SR
20 PD	0.002+-	0.002	0.006	0.010+-	0.001	4.162+-2.260 PD
21 AG	0.005+-	0.003	0.012	0.014+-	0.002	2.573+-0.933 AG
22 CD *	0.129+-	0.027	0.296	0.129+-	0.010	1.003+-0.106 CD
23 IN	0.015+-	0.008	0.034	0.002+-	0.002	0.131+-0.159 IN
24 SH	0.035+-	0.005	0.081	0.026+-	0.003	0.722+-0.106 SH
25 SB	0.050+-	0.014	0.115	0.058+-	0.007	1.160+-0.203 SB
26 BA	0.054+-	0.026	0.123	0.020+-	0.013	0.368+-0.249 BA
27 HG	0.004+-	0.001	0.008	0.004+-	0.001	1.241+-0.278 HG
28 PB *	1.430+-	0.288	3.282	1.423+-	0.072	0.995+-0.071 PB

MEAS. AMB. MASS (UG/M3): 43.6

* - FITTING ELEMENT

CMODEQ RESULTS FOR CMB # Q74 4

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

ALL VALID SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.491 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.502+-	0.213	1.020+-	0.443
13	GEO-K	*	30.486+-	1.812	61.995+-	6.538
65	DRBLD	*	0.307+-	0.142	0.625+-	0.293
67	BLFUP	*	1.184+-	0.330	2.407+-	0.704
73	ZHKLD	*	0.738+-	0.354	1.501+-	0.731
79	WSTOV	*	4.791+-	2.079	9.743+-	4.312

TOTAL: 38.007+- 2.811 77.291+- 8.834

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	1.787+-	0.193	3.635	1.678+-	0.166	0.939+-0.128 AL
2 SI *	6.304+-	0.704	12.820	6.006+-	0.598	0.953+-0.131 SI
3 P	0.109+-	0.010	0.222	0.065+-	0.005	0.594+-0.053 P
4 S	1.217+-	0.153	2.474	0.620+-	0.049	0.510+-0.045 S
5 CL	0.114+-	0.017	0.232	0.070+-	0.013	0.611+-0.131 CL
6 K *	0.529+-	0.052	1.077	0.533+-	0.036	1.006+-0.097 K
7 CA *	1.431+-	0.159	2.910	1.369+-	0.130	0.957+-0.126 CA
8 TI *	0.095+-	0.011	0.193	0.093+-	0.009	0.976+-0.134 TI
9 V	0.008+-	0.001	0.016	0.007+-	0.001	0.806+-0.102 V
10 CR	0.009+-	0.001	0.018	0.009+-	0.001	0.965+-0.127 CR
11 MN *	0.044+-	0.005	0.089	0.040+-	0.004	0.919+-0.121 MN
12 FE *	1.369+-	0.146	2.662	1.225+-	0.120	0.936+-0.125 FE
13 NI *	0.014+-	0.002	0.029	0.017+-	0.001	1.199+-0.163 NI
14 CU *	1.955+-	0.375	3.975	2.529+-	0.251	1.294+-0.210 CU
15 ZH *	1.067+-	0.210	2.170	1.024+-	0.067	0.960+-0.087 ZH
16 AS *	0.208+-	0.029	0.422	0.206+-	0.013	0.990+-0.090 AS
17 SE	0.004+-	0.001	0.008	0.006+-	0.000	1.443+-0.192 SE
18 BR *	0.048+-	0.005	0.098	0.047+-	0.013	0.971+-0.379 BR
19 SR	0.015+-	0.002	0.031	0.013+-	0.001	0.859+-0.104 SR
20 PD	0.005+-	0.002	0.009	0.008+-	0.001	1.672+-0.422 PD
21 AG	0.011+-	0.003	0.022	0.011+-	0.002	0.999+-0.202 AG
22 CD *	0.175+-	0.038	0.355	0.162+-	0.013	0.925+-0.098 CD
23 IN	0.005+-	0.002	0.010	0.003+-	0.002	0.610+-0.526 IN
24 SH	0.022+-	0.005	0.045	0.027+-	0.003	1.218+-0.224 SH
25 SB	0.068+-	0.012	0.138	0.067+-	0.007	0.990+-0.149 SB
26 BA	0.022+-	0.008	0.045	0.034+-	0.013	1.511+-1.024 BA
27 HG	0.003+-	0.001	0.007	0.004+-	0.001	1.105+-0.295 HG
28 PB *	1.512+-	0.196	3.075	1.595+-	0.103	1.055+-0.099 PB

MEAS. AMB. MASS (UG/M3): 49.2

* - FITTING ELEMENT

CMDBER RESULTS FOR CMB # QT4-4
 TOTAL PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 4
 ALL VALID SAMPLES
 SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 3.135 D OF F: 6
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.660+-	0.270	1.343+-	0.562
14	GEO-L	*	26.048+-	1.730	52.971+-	5.803
65	DRBLD	*	0.471+-	0.145	0.957+-	0.307
67	BLFUP	*	1.612+-	0.332	3.279+-	0.734
73	ZHKLD	*	1.108+-	0.357	2.253+-	0.752
74	CUKST	*	2.280+-	0.748	4.637+-	1.573
79	WSTOV	*	2.768+-	2.295	5.628+-	4.692

TOTAL: 34.948+- 3.025 71.069+- 8.728

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	1.787+-	0.193	3.635	2.135+-	0.211 1.195+-0.184 AL
2 SI *	6.304+-	0.704	12.820	7.568+-	0.754 1.200+-0.187 SI
3 P	0.109+-	0.010	0.222	0.074+-	0.005 0.679+-0.060 P
4 S	1.217+-	0.153	2.474	0.626+-	0.040 0.515+-0.037 S
5 CL	0.114+-	0.017	0.232	0.145+-	0.017 1.269+-0.245 CL
6 K *	0.529+-	0.052	1.077	0.561+-	0.044 1.059+-0.120 K
7 CA *	1.431+-	0.159	2.910	0.821+-	0.075 0.574+-0.060 CA
8 TI *	0.095+-	0.011	0.193	0.105+-	0.010 1.104+-0.161 TI
9 Y	0.008+-	0.001	0.016	0.007+-	0.001 0.955+-0.110 Y
10 CR	0.009+-	0.001	0.018	0.007+-	0.001 0.802+-0.090 CR
11 MN *	0.044+-	0.005	0.089	0.033+-	0.003 0.764+-0.093 MN
12 FE *	1.309+-	0.146	2.662	1.243+-	0.121 0.950+-0.127 FE
13 NI	0.014+-	0.002	0.029	0.014+-	0.001 0.979+-0.077 NI
14 CU *	1.955+-	0.375	3.975	1.986+-	0.143 1.016+-0.104 CU
15 ZN *	1.067+-	0.210	2.170	1.084+-	0.076 1.016+-0.101 ZN
16 AS *	0.208+-	0.029	0.422	0.209+-	0.015 1.008+-0.105 AS
17 SE	0.004+-	0.001	0.008	0.007+-	0.001 1.747+-0.266 SE
18 BR *	0.048+-	0.005	0.098	0.053+-	0.017 1.096+-0.529 BR
19 SR	0.015+-	0.002	0.031	0.012+-	0.001 0.789+-0.089 SR
20 PD	0.005+-	0.002	0.009	0.009+-	0.001 2.046+-0.595 PD
21 AG	0.011+-	0.003	0.022	0.010+-	0.002 0.935+-0.203 AG
22 CD *	0.175+-	0.038	0.355	0.188+-	0.017 1.074+-0.140 CD
23 IN	0.005+-	0.002	0.010	0.002+-	0.002 0.415+-0.475 IN
24 SN	0.022+-	0.005	0.045	0.025+-	0.003 1.122+-0.192 SN
25 SB	0.068+-	0.012	0.138	0.044+-	0.006 0.643+-0.103 SB
26 BA	0.022+-	0.008	0.045	0.017+-	0.011 0.766+-0.647 BA
27 HG	0.003+-	0.001	0.007	0.004+-	0.001 1.207+-0.293 HG
28 PB *	1.512+-	0.196	3.075	1.421+-	0.085 0.940+-0.077 PB

MEAS. AMB. MASS (UG/M3): 49.2

* - FITTING ELEMENT

CM80EQ RESULTS FOR CMB # QT4.40

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 4

CO-COLLECTED SAMPLES

SITE: HADFIELD

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.331 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.527+- 0.224	1.043+- 0.452
13	GEO-K	*	31.721+- 1.979	62.778+- 6.800
65	DRBLD	*	0.314+- 0.150	0.622+- 0.301
67	BLFUP	*	1.240+- 0.349	2.454+- 0.725
73	ZHKLD	*	0.757+- 0.378	1.499+- 0.760
79	WSTOV	*	4.713+- 2.181	9.327+- 4.395

TOTAL: 39.271+- 3.002 77.722+- 9.091

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	1.825+- 0.202	3.611	1.745+- 0.173	0.956+- 0.131	AL	
2 SI *	6.444+- 0.738	12.752	6.248+- 0.623	0.970+- 0.135	SI	
3 P	0.112+- 0.011	0.221	0.067+- 0.005	0.601+- 0.054	P	
4 S	1.261+- 0.161	2.495	0.644+- 0.051	0.511+- 0.045	S	
5 CL	0.105+- 0.013	0.209	0.072+- 0.013	0.683+- 0.152	CL	
6 K *	0.543+- 0.055	1.075	0.545+- 0.038	1.004+- 0.098	K	
7 CA *	1.457+- 0.169	2.883	1.422+- 0.135	0.976+- 0.130	CA	
8 TI *	0.097+- 0.011	0.191	0.096+- 0.009	0.996+- 0.139	TI	
9 V	0.008+- 0.001	0.016	0.007+- 0.001	0.838+- 0.108	V	
10 CR	0.009+- 0.001	0.018	0.009+- 0.001	0.982+- 0.131	CR	
11 MH *	0.044+- 0.006	0.087	0.042+- 0.004	0.947+- 0.127	MH	
12 FE *	1.339+- 0.153	2.650	1.274+- 0.125	0.952+- 0.129	FE	
13 NI	0.014+- 0.002	0.029	0.012+- 0.002	1.212+- 0.166	NI	
14 CU *	2.021+- 0.339	3.999	2.631+- 0.261	1.302+- 0.212	CU	
15 ZH *	1.076+- 0.225	2.129	1.059+- 0.069	0.984+- 0.090	ZH	
16 AS *	0.214+- 0.031	0.423	0.213+- 0.014	0.995+- 0.090	AS	
17 SE	0.004+- 0.001	0.008	0.006+- 0.000	1.492+- 0.203	SE	
18 BR *	0.050+- 0.005	0.099	0.049+- 0.014	0.984+- 0.388	BR	
19 SR	0.016+- 0.002	0.031	0.013+- 0.001	0.859+- 0.104	SR	
20 PD	0.005+- 0.002	0.010	0.008+- 0.001	1.621+- 0.402	PD	
21 AG	0.011+- 0.003	0.022	0.011+- 0.002	1.010+- 0.206	AG	
22 CD *	0.182+- 0.040	0.360	0.169+- 0.013	0.928+- 0.099	CD	
23 IN	0.005+- 0.002	0.010	0.003+- 0.002	0.594+- 0.511	IN	
24 SN	0.022+- 0.006	0.044	0.028+- 0.003	1.252+- 0.235	SN	
25 SB	0.067+- 0.012	0.132	0.070+- 0.007	1.045+- 0.162	SB	
26 BA	0.024+- 0.009	0.047	0.035+- 0.013	1.467+- 0.974	BA	
27 HG	0.003+- 0.001	0.007	0.004+- 0.001	1.113+- 0.299	HG	
28 PB *	1.558+- 0.207	3.084	1.662+- 0.107	1.067+- 0.101	PB	

MEAS. AMB. MASS (UG/M3): 50.5

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # QT4 4C
 TOTAL PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 4
 CO-COLLECTED SAMPLES
 SITE: HADFIELD

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 2.904 D OF F: 6
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.680+-	0.279	1.346+-	0.565
14	GEO-L	*	26.453+-	1.789	52.353+-	5.833
65	DRBLD	*	0.485+-	0.153	0.959+-	0.314
67	BLFUP	*	1.686+-	0.351	3.337+-	0.755
73	ZNKLD	*	1.108+-	0.380	2.193+-	0.776
74	CUKST	*	2.382+-	0.793	4.714+-	1.624
79	WSTOV	*	2.922+-	2.372	5.782+-	4.722

TOTAL: 35.715+- 3.135 70.684+- 8.812

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	1.825+-	0.202	3.611	2.169+-	0.215	1.189+-0.183 AL
2 SI *	6.444+-	0.738	12.752	7.686+-	0.766	1.193+-0.185 SI
3 P	0.112+-	0.011	0.221	0.076+-	0.005	0.679+-0.059 P
4 S	1.261+-	0.161	2.495	0.646+-	0.042	0.513+-0.037 S
5 CL	0.105+-	0.013	0.209	0.151+-	0.018	1.427+-0.298 CL
6 K *	0.543+-	0.055	1.075	0.574+-	0.044	1.056+-0.119 K
7 CA *	1.457+-	0.169	2.883	0.836+-	0.076	0.574+-0.060 CA
8 TI *	0.097+-	0.011	0.191	0.106+-	0.010	1.101+-0.160 TI
9 V	0.008+-	0.001	0.016	0.007+-	0.001	0.868+-0.113 V
10 CR	0.009+-	0.001	0.018	0.007+-	0.001	0.799+-0.089 CR
11 MN *	0.044+-	0.006	0.087	0.034+-	0.003	0.770+-0.093 MN
12 FE *	1.339+-	0.153	2.650	1.264+-	0.122	0.944+-0.126 FE
13 NI	0.014+-	0.002	0.029	0.014+-	0.001	0.978+-0.077 NI
14 CU *	2.021+-	0.399	3.999	2.053+-	0.148	1.016+-0.105 CU
15 ZN *	1.076+-	0.225	2.129	1.093+-	0.076	1.016+-0.101 ZN
16 AS *	0.214+-	0.031	0.423	0.215+-	0.016	1.008+-0.105 AS
17 SE	0.004+-	0.001	0.008	0.007+-	0.001	1.769+-0.271 SE
18 BR *	0.050+-	0.005	0.099	0.054+-	0.018	1.091+-0.526 BR
19 SR	0.016+-	0.002	0.031	0.012+-	0.001	0.774+-0.086 SR
20 PD	0.005+-	0.002	0.010	0.010+-	0.001	1.979+-0.555 PD
21 AG	0.011+-	0.003	0.022	0.010+-	0.002	0.932+-0.200 AG
22 CD *	0.182+-	0.040	0.360	0.196+-	0.017	1.075+-0.140 CD
23 IN	0.005+-	0.002	0.010	0.002+-	0.002	0.402+-0.452 IN
24 SH	0.022+-	0.006	0.044	0.025+-	0.003	1.137+-0.195 SH
25 SB	0.067+-	0.012	0.132	0.045+-	0.006	0.668+-0.108 SB
26 BA	0.024+-	0.009	0.047	0.017+-	0.012	0.731+-0.604 BA
27 HG	0.003+-	0.001	0.007	0.004+-	0.001	1.195+-0.289 HG
28 PB *	1.558+-	0.207	3.084	1.465+-	0.088	0.940+-0.077 PB

MEAS. AMB. MASS (UG/M3): 50.5

* - FITTING ELEMENT

DLED: 06/22/82 14:39
 RTED: 06/22/82 14:39, UN: CE2P BY: B

CM8DER RESULTS FOR CM8 # QF5 4

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 5

ALL VALID SAMPLES

SITE: HASTIE

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.667 D OF F: 7

CODE SOURCE FLG UG/M3

1	TRANS	*	0.702+-	0.229	3.646+-	1.279
19	GEO-R	*	0.528+-	0.086	2.741+-	0.572
64	ZNBLO	*	2.773+-	0.469	14.407+-	3.072
65	DRBLO	*	0.335+-	0.065	1.743+-	0.405
67	BLFUP	*	0.686+-	0.151	3.563+-	0.911
74	CUKST	*	0.450+-	0.118	2.341+-	0.686
77	SEC80	*	2.433+-	0.510	12.642+-	3.116
79	WSTOV	*	10.618+-	6.214	56.213+-	33.106

TOTAL: 18.724+- 6.261 97.298+-34.899

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	PATIO	
1 AL *	0.109+-	0.012	0.566	0.100+-	0.007	0.929+-0.083 AL
2 SI *	0.230+-	0.027	1.198	0.251+-	0.018	1.088+-0.112 SI
3 P	0.063+-	0.007	0.327	0.019+-	0.001	0.310+-0.016 P
4 S *	0.877+-	0.103	4.558	0.877+-	0.062	1.000+-0.100 S
5 CL	0.058+-	0.009	0.299	0.095+-	0.011	1.657+-0.377 CL
6 K *	0.116+-	0.012	0.603	0.118+-	0.014	1.013+-0.173 K
7 CA *	0.064+-	0.009	0.334	0.055+-	0.009	0.859+-0.179 CA
8 TI *	0.003+-	0.001	0.017	0.004+-	0.000	1.168+-0.123 TI
9 V	0.001+-	0.000	0.003	0.000+-	0.000	0.590+-0.225 V
10 CR	0.001+-	0.000	0.005	0.001+-	0.000	0.763+-0.165 CR
11 MH *	0.002+-	0.000	0.013	0.002+-	0.000	0.788+-0.207 MH
12 FE *	0.046+-	0.005	0.239	0.046+-	0.003	0.992+-0.105 FE
13 NI	0.003+-	0.001	0.014	0.004+-	0.000	1.377+-0.140 NI
14 CU *	0.255+-	0.059	1.326	0.258+-	0.024	1.009+-0.136 CU
15 ZN *	0.770+-	0.094	4.003	0.715+-	0.064	0.928+-0.113 ZN
16 AS *	0.237+-	0.033	1.234	0.245+-	0.020	1.033+-0.119 AS
17 SE	0.003+-	0.000	0.015	0.002+-	0.000	0.611+-0.065 SE
18 BR *	0.038+-	0.004	0.197	0.048+-	0.018	1.254+-0.770 BR
19 SR	0.000+-	0.000	0.002	0.001+-	0.000	3.463+-1.739 SR
20 PD	0.002+-	0.001	0.011	0.019+-	0.001	8.837+-5.108 PD
21 AG	0.005+-	0.002	0.025	0.007+-	0.001	1.343+-0.204 AG
22 CD *	0.140+-	0.026	0.727	0.125+-	0.011	0.891+-0.109 CD
23 IN	0.003+-	0.001	0.015	0.000+-	0.001	0.170+-0.243 IN
24 SN	0.014+-	0.003	0.073	0.018+-	0.002	1.256+-0.175 SN
25 SB *	0.034+-	0.009	0.179	0.028+-	0.004	0.817+-0.139 SB
26 BA	0.009+-	0.006	0.046	0.003+-	0.004	0.321+-0.426 BA
27 HG	0.003+-	0.001	0.014	0.003+-	0.000	1.062+-0.125 HG
28 PB *	0.667+-	0.087	3.465	0.740+-	0.047	1.109+-0.105 PB

MEAS. AMB. MASS (UG/M3): 19.2

* - FITTING ELEMENT

COMBINE RESULTS FOR CMB # 875 40

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 5

CO-COLLECTED SAMPLES

SITE: HASTIE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE 0.550 D OF F: 7
CODE SOURCE FLG UG/M3

1	TRANS	*	0.722+-	0.237	3.530+-	1.248	
19	GEO-B	*	0.542+-	0.092	2.652+-	0.570	
64	ZNBLD	*	3.059+-	0.499	14.963+-	3.143	
65	DRBLD	*	0.365+-	0.069	1.786+-	0.413	
67	BLFUP	*	0.712+-	0.165	3.482+-	0.929	
74	CUKST	*	0.490+-	0.101	2.399+-	0.715	
77	SECSO	*	2.634+-	0.543	12.884+-	3.156	
79	USTOV	*	11.462+-	5.630	56.970+-	33.271	

TOTAL:			19.986+-	6.679	97.764+-	35.147	

SPECIE			FINE		SUSPENDED		PARTICULATE			
CODE			MEAS.	UG/M3	PERCENT	CALC	UG/M3	RATIO		

1	AL	*	0.115+-	0.013	0.564	0.106+-	0.007	0.923+-	0.083	AL
2	SI	*	0.241+-	0.030	1.179	0.265+-	0.019	1.100+-	0.113	SI
3	P		0.068+-	0.007	0.331	0.021+-	0.001	0.307+-	0.016	P
4	S	*	0.944+-	0.109	4.619	0.944+-	0.067	1.000+-	0.101	S
5	CL		0.058+-	0.010	0.282	0.102+-	0.012	1.779+-	0.427	CL
6	K	*	0.124+-	0.012	0.609	0.126+-	0.016	1.015+-	0.173	K
7	CA	*	0.069+-	0.010	0.338	0.057+-	0.009	0.830+-	0.174	CA
8	TI	*	0.004+-	0.001	0.018	0.004+-	0.000	1.135+-	0.117	TI
9	V		0.001+-	0.000	0.003	0.000+-	0.000	0.628+-	0.244	V
10	CR		0.001+-	0.000	0.005	0.001+-	0.000	0.736+-	0.156	CR
11	MN	*	0.002+-	0.000	0.012	0.002+-	0.000	0.354+-	0.232	MN
12	FE	*	0.049+-	0.006	0.238	0.048+-	0.004	0.985+-	0.103	FE
13	NI		0.003+-	0.001	0.013	0.004+-	0.000	1.482+-	0.159	NI
14	CU	*	0.277+-	0.066	1.753	0.280+-	0.027	1.013+-	0.137	CU
15	ZN	*	0.838+-	0.097	4.098	0.783+-	0.070	0.935+-	0.115	ZN
16	AS	*	0.258+-	0.036	1.263	0.266+-	0.021	1.030+-	0.119	AS
17	SE		0.003+-	0.000	0.016	0.002+-	0.000	0.597+-	0.062	SE
18	BR	*	0.040+-	0.004	0.197	0.049+-	0.019	1.220+-	0.736	BR
19	SR		0.000+-	0.000	0.002	0.001+-	0.000	2.781+-	1.134	SR
20	PO		0.002+-	0.001	0.010	0.021+-	0.001	9.999+-	9.999	PO
21	AG		0.005+-	0.002	0.025	0.007+-	0.001	1.401+-	0.216	AG
22	CO	*	0.144+-	0.029	0.704	0.130+-	0.012	0.903+-	0.110	CO
23	IN		0.001+-	0.001	0.007	0.001+-	0.001	0.341+-	0.493	IN
24	SN		0.016+-	0.003	0.078	0.019+-	0.002	1.203+-	0.163	SN
25	SB	*	0.037+-	0.010	0.132	0.031+-	0.004	0.823+-	0.139	SB
26	BA		0.010+-	0.007	0.049	0.003+-	0.004	0.306+-	0.396	BA
27	HG		0.003+-	0.001	0.013	0.003+-	0.000	1.140+-	0.138	HG
28	PB	*	0.724+-	0.092	3.541	0.786+-	0.050	1.086+-	0.102	PB

MEAS. AMB. MASS (UG/M3): 20.4

* - FITTING ELEMENT

R: E400

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EL: PRT005 -FORM -COPIES 1

ULED: 06/22/82 14:30
RTED: 06/22/82 14:33, ON: CE2P BY: Q

CMBDEQ RESULTS FOR CMB # 805.4

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 5

ALL VALID SAMPLES

SITE: HASTIE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.292 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.101+-	0.047	0.599+-	0.289
19	GEO-Q	*	10.522+-	0.924	62.381+-	9.622
26	LIHE	*	0.877+-	0.540	5.197+-	3.268
64	ZNBLO	*	2.284+-	0.517	13.542+-	3.514
65	DRBLO	*	0.195+-	0.071	1.155+-	0.443
67	BLFUP	*	0.492+-	0.096	2.919+-	0.677
74	CUKST	*	1.190+-	0.248	7.052+-	1.720

TOTAL: 15.660+- 1.221 92.845+-13.821

SPECIE CODE	MEAS	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	0.770+-	0.118	4.565	0.781+-	0.074	1.015+-0.137 AL
2 SI *	2.617+-	0.399	15.515	2.643+-	0.254	1.010+-0.138 SI
3 P	0.039+-	0.004	0.233	0.031+-	0.002	0.782+-0.075 P
4 S	0.469+-	0.061	2.784	0.262+-	0.018	0.558+-0.044 S
5 CL	0.030+-	0.007	0.178	0.046+-	0.004	1.543+-0.234 CL
6 K *	0.220+-	0.033	1.303	0.219+-	0.018	0.998+-0.115 K
7 CA *	0.839+-	0.137	4.976	0.841+-	0.061	1.002+-0.103 CA
8 TI *	0.040+-	0.007	0.240	0.046+-	0.004	1.138+-0.163 TI
9 V	0.004+-	0.001	0.021	0.003+-	0.000	0.831+-0.099 V
10 CR	0.004+-	0.001	0.023	0.004+-	0.000	0.940+-0.108 CR
11 MH *	0.023+-	0.004	0.136	0.017+-	0.002	0.763+-0.088 MH
12 FE *	0.606+-	0.096	3.593	0.598+-	0.056	0.986+-0.129 FE
13 NI *	0.006+-	0.001	0.036	0.006+-	0.000	1.016+-0.082 NI
14 CU *	0.757+-	0.140	4.490	0.747+-	0.065	0.986+-0.121 CU
15 ZN *	0.630+-	0.084	3.737	0.643+-	0.045	1.021+-0.102 ZN
16 AS *	0.082+-	0.013	0.484	0.082+-	0.005	1.004+-0.083 AS
17 SE	0.002+-	0.000	0.012	0.001+-	0.000	0.623+-0.072 SE
18 BR *	0.012+-	0.001	0.069	0.012+-	0.003	1.008+-0.322 BR
19 SR	0.007+-	0.001	0.039	0.006+-	0.000	0.851+-0.092 SR
20 PD	0.002+-	0.001	0.011	0.005+-	0.000	2.748+-0.737 PD
21 AG	0.005+-	0.002	0.027	0.005+-	0.001	1.032+-0.175 AG
22 CD *	0.051+-	0.006	0.301	0.051+-	0.004	1.007+-0.113 CD
23 IN	0.001+-	0.001	0.008	0.002+-	0.001	1.170+-0.886 IN
24 SN	0.011+-	0.004	0.066	0.018+-	0.001	1.567+-0.236 SN
25 SB	0.033+-	0.006	0.193	0.018+-	0.002	0.545+-0.076 SB
26 BA	0.009+-	0.005	0.056	0.001+-	0.005	0.073+-0.485 BA
27 HG	0.002+-	0.001	0.013	0.002+-	0.000	0.704+-0.142 HG
28 PB *	0.663+-	0.101	3.931	0.630+-	0.035	0.950+-0.073 PB

MEAS. AMB. MASS (UG/M3): 16.9

* - FITTING ELEMENT

CMDED RESULTS FOR CMB # Q05 40

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 5

CO-COLLECTED SAMPLES

SITE: HASTIE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.311 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.112+- 0.051	0.622+- 0.298
19	GEO-Q	*	10.948+- 1.007	60.992+- 9.674
26	LIME	*	0.995+- 0.589	5.543+- 3.360
64	ZNBLO	*	2.554+- 0.552	14.229+- 3.584
65	DRBLO	*	0.226+- 0.075	1.259+- 0.446
67	BLFUP	*	0.529+- 0.102	2.947+- 0.684
74	CUKST	*	1.287+- 0.268	7.170+- 1.758

TOTAL: 16.651+- 1.325 92.763+-14.078

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO
1 AL *	0.798+- 0.131	4.448	0.916+- 0.077	1.022+-0.138	AL
2 SI *	2.714+- 0.443	15.117	2.758+- 0.264	1.016+-0.139	SI
3 P	0.041+- 0.005	0.231	0.032+- 0.002	0.780+-0.074	P
4 S	0.512+- 0.063	2.855	0.279+- 0.019	0.544+-0.042	S
5 CL	0.031+- 0.007	0.170	0.050+- 0.004	1.638+-0.258	CL
6 K *	0.227+- 0.037	1.266	0.231+- 0.019	1.018+-0.117	K
7 CA *	0.900+- 0.150	5.012	0.901+- 0.065	1.001+-0.102	CA
8 TI *	0.042+- 0.007	0.236	0.048+- 0.005	1.135+-0.162	TI
9 V	0.004+- 0.001	0.020	0.003+- 0.000	0.870+-0.105	V
10 CR	0.004+- 0.001	0.023	0.004+- 0.000	0.917+-0.104	CR
11 MN *	0.024+- 0.005	0.136	0.018+- 0.002	0.751+-0.085	MN
12 FE *	0.638+- 0.106	3.552	0.625+- 0.059	0.980+-0.128	FE
13 NI *	0.007+- 0.001	0.037	0.007+- 0.000	0.993+-0.078	NI
14 CU *	0.801+- 0.156	4.462	0.805+- 0.070	1.005+-0.125	CU
15 ZN *	0.686+- 0.089	3.821	0.705+- 0.050	1.028+-0.104	ZN
16 AS *	0.091+- 0.013	0.505	0.091+- 0.005	1.006+-0.084	AS
17 SE	0.002+- 0.000	0.013	0.001+- 0.000	0.592+-0.066	SE
18 BR *	0.013+- 0.002	0.071	0.013+- 0.003	1.012+-0.328	BR
19 SR	0.007+- 0.001	0.040	0.006+- 0.000	0.934+-0.088	SR
20 PD	0.002+- 0.001	0.009	0.005+- 0.000	3.233+-0.975	PD
21 AG	0.005+- 0.002	0.026	0.005+- 0.001	1.086+-0.184	AG
22 CD *	0.054+- 0.007	0.303	0.055+- 0.004	1.010+-0.113	CD
23 IN	0.001+- 0.001	0.008	0.002+- 0.001	1.123+-0.782	IN
24 SN	0.013+- 0.004	0.070	0.019+- 0.002	1.533+-0.225	SN
25 SB	0.035+- 0.007	0.196	0.019+- 0.002	0.549+-0.075	SB
26 BA	0.011+- 0.006	0.060	0.001+- 0.005	0.073+-0.451	BA
27 HG	0.002+- 0.001	0.013	0.002+- 0.000	0.727+-0.145	HG
28 PB *	0.726+- 0.107	4.045	0.682+- 0.038	0.939+-0.071	PB

MEAS. AMB. MASS (UG/M3): 18.0

* - FITTING ELEMENT



USER: E400

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LABEL: PRT006 -FORM -COPIES 1

SPOOLED: 06/22/82 14:41

STARTED: 06/22/82 14:42, ON: CE2P BY: 9

CMDED RESULTS FOR CMB # QTS.4

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 5

ALL VALID SAMPLES

SITE: HASTIE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.373 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.577+- 0.241	1.284+- 0.546
19	GEO-Q	*	20.545+- 1.621	45.697+- 5.290
26	LIME	*	1.194+- 0.922	2.656+- 2.064
64	ZNBLO	*	6.373+- 1.109	14.175+- 2.743
65	DRBLO	*	0.964+- 0.214	2.145+- 0.509
67	BLFUP	*	1.452+- 0.268	3.230+- 0.656
74	CUKST	*	2.992+- 0.544	6.656+- 1.336

TOTAL: 34.098+- 2.276 75.842+- 8.180

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	1.500+- 0.192	3.337	1.394+- 0.130	0.929+- 0.119	AL	
2 SI *	5.093+- 0.679	11.328	4.988+- 0.477	0.979+- 0.131	SI	
3 P	0.109+- 0.010	0.242	0.056+- 0.004	0.517+- 0.038	P	
4 S	1.410+- 0.140	3.137	0.581+- 0.044	0.412+- 0.034	S	
5 CL	0.086+- 0.015	0.192	0.142+- 0.016	1.648+- 0.362	CL	
6 K *	0.454+- 0.051	1.010	0.439+- 0.033	0.967+- 0.101	K	
7 CA *	1.525+- 0.215	3.392	1.530+- 0.116	1.003+- 0.108	CA	
8 TI *	0.075+- 0.010	0.168	0.088+- 0.008	1.167+- 0.167	TI	
9 V	0.006+- 0.001	0.014	0.006+- 0.001	0.962+- 0.120	V	
10 CR	0.009+- 0.001	0.020	0.008+- 0.001	0.902+- 0.096	CR	
11 MN *	0.041+- 0.006	0.091	0.035+- 0.003	0.843+- 0.097	MN	
12 FE *	1.122+- 0.140	2.495	1.184+- 0.107	1.055+- 0.138	FE	
13 NI *	0.016+- 0.002	0.035	0.015+- 0.001	0.983+- 0.072	NI	
14 CU *	1.908+- 0.307	4.243	1.940+- 0.164	1.017+- 0.123	CU	
15 ZN *	1.573+- 0.173	3.498	1.538+- 0.119	0.978+- 0.106	ZN	
16 AS *	0.345+- 0.044	0.767	0.348+- 0.030	1.008+- 0.122	AS	
17 SE	0.005+- 0.001	0.011	0.004+- 0.000	0.861+- 0.080	SE	
18 BR *	0.052+- 0.005	0.115	0.050+- 0.015	0.972+- 0.404	BR	
19 SR	0.014+- 0.002	0.032	0.012+- 0.001	0.834+- 0.082	SR	
20 PD	0.004+- 0.001	0.009	0.022+- 0.001	5.466+- 1.900	PD	
21 AG *	0.015+- 0.003	0.033	0.014+- 0.001	0.947+- 0.080	AG	
22 CD *	0.198+- 0.025	0.441	0.188+- 0.015	0.947+- 0.104	CD	
23 IN	0.003+- 0.002	0.007	0.008+- 0.001	2.536+- 0.793	IN	
24 SN	0.030+- 0.005	0.067	0.049+- 0.003	1.612+- 0.178	SN	
25 SB	0.108+- 0.016	0.240	0.068+- 0.005	0.628+- 0.053	SB	
26 BA	0.048+- 0.014	0.107	0.014+- 0.005	0.284+- 0.115	BA	
27 HG	0.008+- 0.001	0.018	0.004+- 0.001	0.504+- 0.081	HG	
28 PB *	1.720+- 0.192	3.826	1.878+- 0.098	1.092+- 0.085	PB	

MEAS. AMB. MASS (UG/M3): 45.0

* - FITTING ELEMENT

CMSDEQ RESULTS FOR CMB # QTS 40

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 5

CO-COLLECTED SAMPLES

SITE: HASTIE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.330 D OF F: 3
CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.624+-	0.261	1.386+-	0.596
19	GED-Q	*	19.131+-	1.734	42.484+-	5.683
26	LIME	*	1.371+-	0.992	3.045+-	2.224
64	ZNBLD	*	7.162+-	1.188	15.904+-	3.068
65	DRBLD	*	1.091+-	0.233	2.422+-	0.569
67	BLFUP	*	1.570+-	0.290	3.486+-	0.731
74	CUKST	*	3.076+-	0.604	6.832+-	1.501

TOTAL: 34.024+- 2.444 75.560+- 9.204

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	1.402+-	0.215	3.114	1.315+-	0.121
2 SI *	4.771+-	0.766	10.596	4.688+-	0.444
3 P	0.113+-	0.012	0.251	0.056+-	0.003
4 S	1.500+-	0.154	3.331	0.593+-	0.047
5 CL	0.089+-	0.016	0.197	0.149+-	0.017
6 K *	0.443+-	0.059	0.983	0.430+-	0.031
7 CA *	1.506+-	0.239	3.345	1.511+-	0.111
8 TI *	0.071+-	0.012	0.157	0.083+-	0.008
9 Y	0.006+-	0.001	0.013	0.006+-	0.001
10 CR	0.009+-	0.001	0.020	0.008+-	0.001
11 MN *	0.040+-	0.007	0.088	0.033+-	0.003
12 FE *	1.077+-	0.161	2.393	1.124+-	0.099
13 NI *	0.016+-	0.002	0.036	0.016+-	0.001
14 CU *	1.926+-	0.344	4.278	1.973+-	0.168
15 ZN *	1.705+-	0.181	3.786	1.672+-	0.133
16 AS *	0.376+-	0.047	0.836	0.382+-	0.033
17 SE	0.006+-	0.001	0.013	0.005+-	0.000
18 BR *	0.055+-	0.006	0.123	0.054+-	0.016
19 SR	0.014+-	0.002	0.030	0.012+-	0.001
20 PD	0.005+-	0.001	0.011	0.025+-	0.002
21 AG *	0.016+-	0.003	0.035	0.015+-	0.001
22 CD *	0.212+-	0.027	0.471	0.201+-	0.016
23 IN	0.003+-	0.002	0.006	0.008+-	0.001
24 SH	0.033+-	0.006	0.074	0.053+-	0.003
25 SB	0.114+-	0.017	0.253	0.071+-	0.005
26 BA	0.044+-	0.015	0.097	0.014+-	0.005
27 HG	0.009+-	0.001	0.019	0.004+-	0.001
28 PB *	1.824+-	0.210	4.051	1.994+-	0.105

MEAS. AMB. MASS (UG/M3): 45.0

* - FITTING ELEMENT



USER: E400

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LABEL: PRT002 -FORM -COPIES 1

SPOOLED: 06/22/82 14:45
STARTED: 06/22/82 14:45, DN: CE2P BY: Q

CMRDER RESULTS FOR CMB # Q76 4

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 6

ALL VALID SAMPLES

SITE: HIGHWAY

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.284 D OF F: 11

CODE SOURCE FLG UG/M3 %

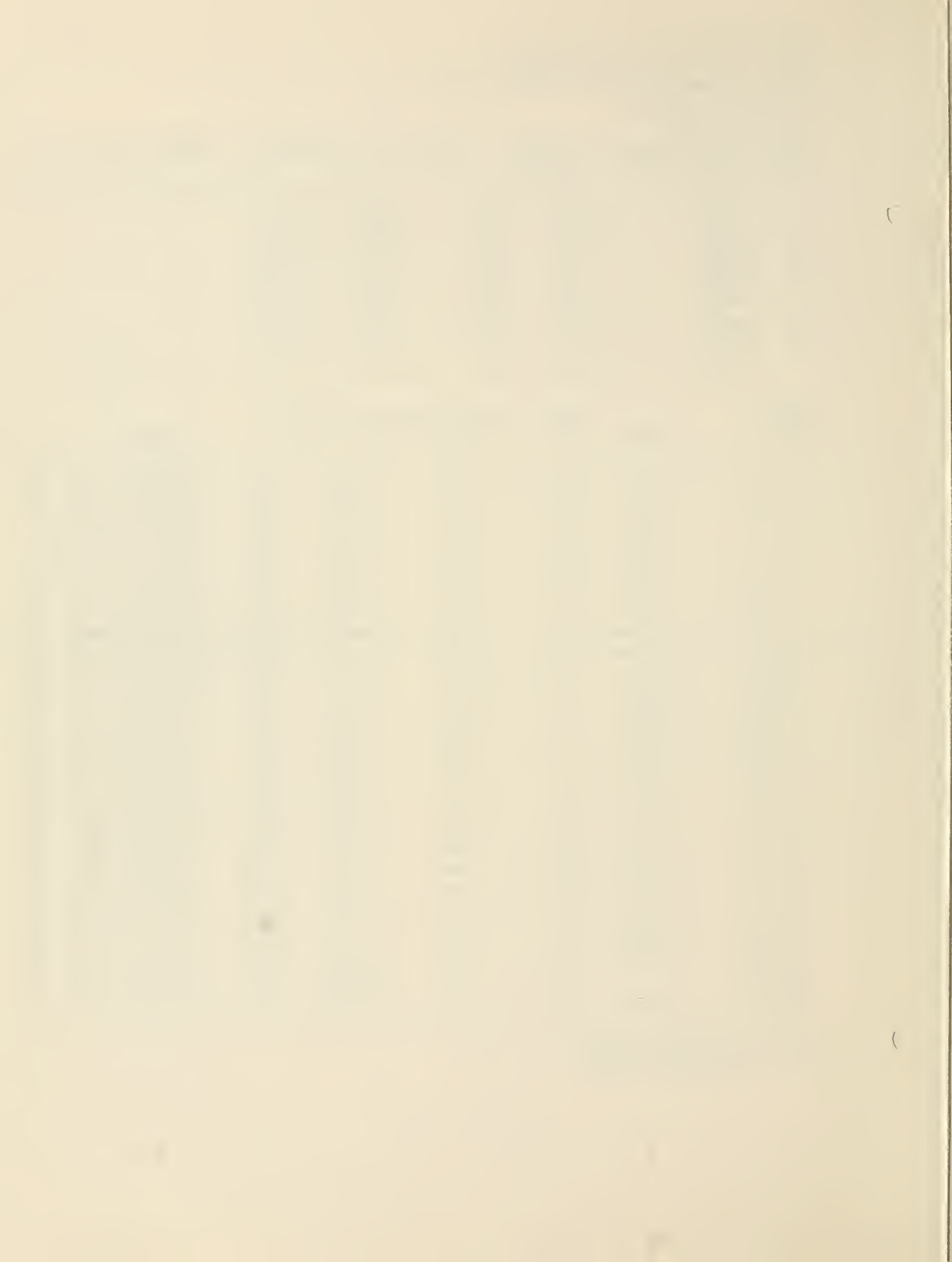
1	TRANS	*	0.630+-	0.296	1.023+-	0.450
13	GEO-K	*	32.341+-	2.465	47.968+-	5.967
63	NOBLD	*	1.688+-	0.953	2.504+-	1.434
65	DRBLD	*	0.773+-	0.230	1.147+-	0.359
67	BLFUP	*	1.164+-	0.353	1.727+-	0.551
73	ZNKLD	*	0.968+-	0.303	1.436+-	0.472
74	CUKST	*	19.905+-	3.837	29.524+-	6.389
79	WSTOV	*	2.601+-	2.233	3.857+-	3.334

TOTAL: 60.130+- 5.201 89.186+-11.680

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC	UG/M3	RATIO	
1 AL *	1.744+-	0.186	2.587	1.854+-	0.176	1.063+-0.148	AL
2 SI *	6.054+-	0.655	8.979	6.466+-	0.635	1.068+-0.153	SI
3 P	0.143+-	0.015	0.212	0.109+-	0.007	0.761+-0.057	P
4 S	1.865+-	0.202	2.766	1.594+-	0.104	0.855+-0.074	S
5 CL	0.293+-	0.047	0.435	0.490+-	0.044	1.669+-0.292	CL
6 K *	0.531+-	0.054	0.788	0.533+-	0.038	1.003+-0.101	K
7 CA *	1.633+-	0.178	2.422	1.637+-	0.139	1.002+-0.121	CA
8 TI *	0.100+-	0.012	0.148	0.103+-	0.010	1.032+-0.139	TI
9 V *	0.009+-	0.001	0.013	0.007+-	0.001	0.798+-0.096	V
10 CR *	0.015+-	0.003	0.022	0.015+-	0.001	1.028+-0.098	CR
11 MN *	0.051+-	0.006	0.076	0.051+-	0.004	0.991+-0.116	MN
12 FE *	1.522+-	0.172	2.257	1.476+-	0.130	0.970+-0.119	FE
13 NI *	0.061+-	0.011	0.091	0.060+-	0.004	0.990+-0.100	NI
14 CU *	13.382+-	2.557	19.848	13.518+-	1.110	1.010+-0.118	CU
15 ZN *	1.335+-	0.165	1.990	1.339+-	0.081	1.003+-0.086	ZN
16 AS *	0.341+-	0.051	0.506	0.343+-	0.025	1.005+-0.105	AS
17 SE	0.068+-	0.001	0.011	0.009+-	0.001	1.212+-0.135	SE
18 BR *	0.066+-	0.007	0.098	0.064+-	0.018	0.974+-0.381	BR
19 SR *	0.020+-	0.002	0.029	0.019+-	0.001	0.957+-0.096	SR
20 PD	0.004+-	0.001	0.006	0.017+-	0.002	4.186+-2.059	PD
21 AG	0.016+-	0.004	0.024	0.018+-	0.002	1.109+-0.161	AG
22 CD *	0.206+-	0.034	0.306	0.199+-	0.013	0.967+-0.088	CD
23 IN	0.011+-	0.004	0.017	0.004+-	0.002	0.373+-0.212	IN
24 SN *	0.046+-	0.009	0.068	0.040+-	0.005	0.870+-0.143	SN
25 SB *	0.096+-	0.014	0.142	0.101+-	0.008	1.051+-0.125	SB
26 BA	0.035+-	0.013	0.052	0.042+-	0.021	1.185+-0.932	BA
27 HG	<	0.001	---	0.006+-	0.001	0.000+-0.000	HG
28 PB *	2.044+-	0.274	3.032	2.194+-	0.116	1.073+-0.083	PB

MEAS. AMB. MASS (UG/M3): 67.4

* - FITTING ELEMENT



USER: E400

RT F


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MMM M      MMM      MMM
M      M M      M M      M
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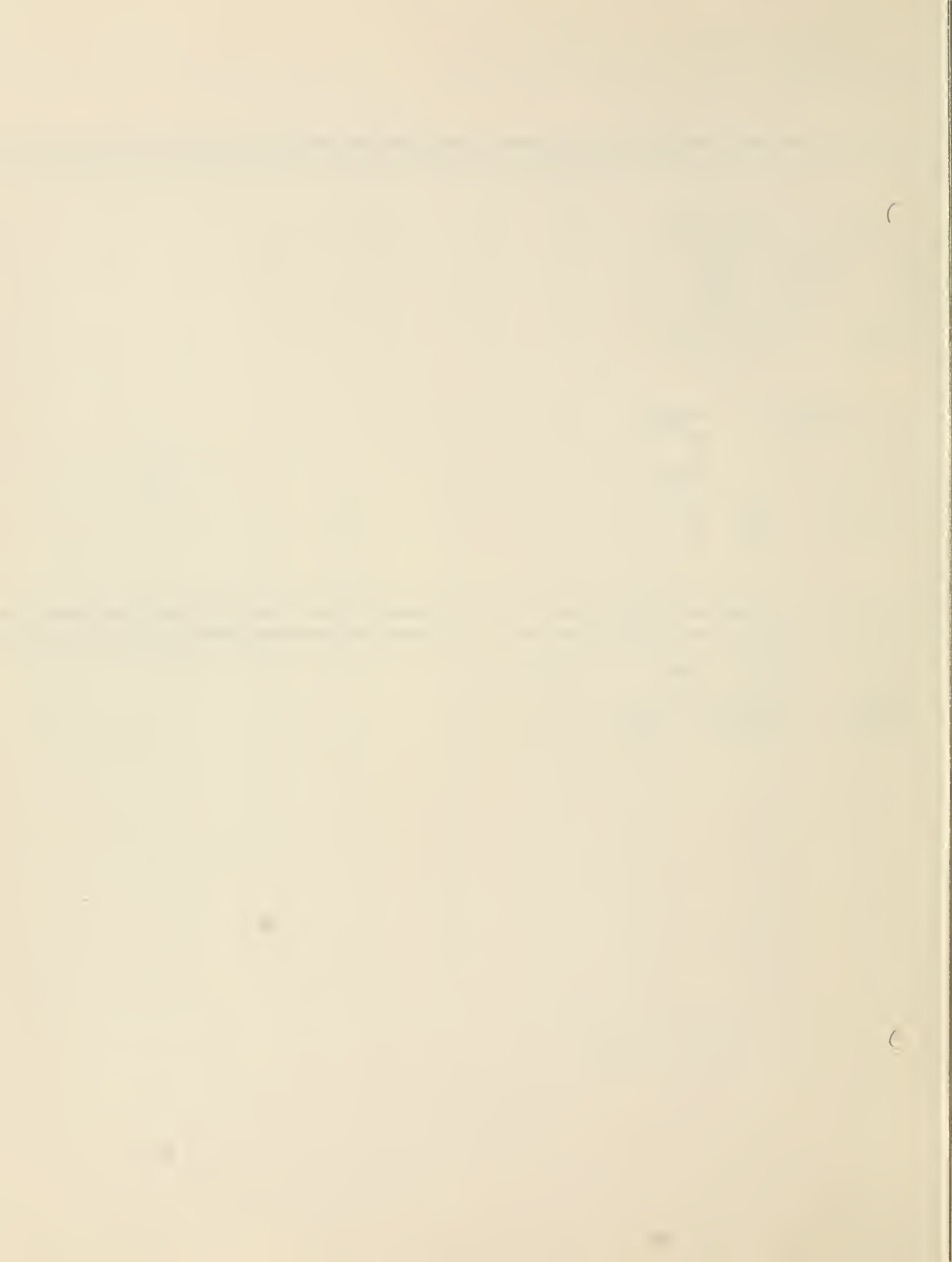
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M M      M      M
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M      M M      MM M

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LABEL: PRT008 -FORM -COPIES 1

SPOOLED: 06/22/82 14:46
STARTED: 06/22/82 14:51, ON: CE2P BY: Q



CMB02Q RESULTS FOR CMB # QF7 2

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 7

ALL VALID SAMPLES

SITE: MICROWAVE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 8.565 D OF F: 3

CODE SOURCE FLG UG/M3

1	TRANS	*	0.016+- 0.009	0.745+- 0.422
3	GEO-A	*	0.133+- 0.043	6.117+- 2.118
4	GEO-B	*	0.131+- 0.046	6.030+- 2.268
68	MSSTK	*	0.056+- 0.034	2.594+- 1.608
69	ZHSTK	*	0.040+- 0.027	1.840+- 1.281
77	SECSO	*	0.282+- 0.260	40.697+-13.122

TOTAL: 1.258+- 0.272 58.023+-14.615

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO
1 AL *	0.039+- 0.009	1.799	0.033+- 0.002	0.844+-0.079	AL
2 SI *	0.083+- 0.012	3.820	0.101+- 0.007	1.216+-0.135	SI
3 P	0.011+- 0.003	0.526	0.001+- 0.000	0.108+-0.006	P
4 S *	0.225+- 0.059	10.399	0.225+- 0.021	1.000+-0.135	S
5 CL	0.003+- 0.002	0.134	0.002+- 0.000	0.667+-0.138	CL
6 K *	0.017+- 0.002	0.789	0.006+- 0.000	0.379+-0.026	K
7 CA *	0.016+- 0.004	0.729	0.018+- 0.001	1.160+-0.134	CA
8 TI	0.001+- 0.001	0.042	0.001+- 0.000	1.245+-0.132	TI
9 V	0.001+- 0.000	0.028	0.000+- 0.000	0.083+-0.020	V
10 CR	0.001+- 0.000	0.042	0.000+- 0.000	0.101+-0.013	CR
11 MN	0.001+- 0.000	0.037	0.000+- 0.000	0.519+-0.068	MN
12 FE *	0.011+- 0.002	0.489	0.013+- 0.001	1.181+-0.109	FE
13 NI	< 0.001	---	0.000+- 0.000	0.000+-0.000	NI
14 CU	0.002+- 0.001	0.074	0.001+- 0.000	0.605+-0.062	CU
15 ZN *	0.019+- 0.014	0.895	0.024+- 0.002	1.232+-0.176	ZN
16 AS	0.005+- 0.004	0.249	0.003+- 0.000	0.624+-0.062	AS
17 SE	0.000+- 0.000	0.014	0.000+- 0.000	0.256+-0.043	SE
18 BR *	0.001+- 0.000	0.051	0.001+- 0.000	1.019+-0.545	BR
19 SR	0.000+- 0.000	0.007	0.000+- 0.000	0.480+-0.062	SR
20 PD	< 0.001	---	0.000+- 0.000	0.000+-0.000	PD
21 AG	< 0.001	---	0.000+- 0.000	0.000+-0.000	AG
22 CD	< 0.001	---	0.001+- 0.000	0.000+-0.000	CD
23 IN	0.002+- 0.002	0.047	0.000+- 0.000	0.015+-0.032	IN
24 SH	< 0.001	---	0.001+- 0.000	0.000+-0.000	SH
25 SB	< 0.001	---	0.001+- 0.000	0.000+-0.000	SB
26 BA	0.012+- 0.012	0.281	0.001+- 0.000	0.094+-0.031	BA
27 HG	0.002+- 0.001	0.078	0.000+- 0.000	0.076+-0.010	HG
28 PB *	0.024+- 0.011	1.103	0.021+- 0.002	0.873+-0.089	PB

MEAS. AMB. MASS (UG/M3): 2.2

* - FITTING ELEMENT

CHBDEQ RESULTS FOR CHB # QF7 3

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 7

ALL VALID SAMPLES

SITE: MICROWAVE

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.340 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.078+- 0.046	1.258+- 0.237
3	GEO.A	*	0.803+- 0.281	13.013+- 6.114
68	MSSTK	*	0.343+- 0.142	5.552+- 2.885
70	BGSTK	*	0.211+- 0.089	3.419+- 1.793
77	SECSO	*	1.328+- 0.537	21.516+-11.009

TOTAL: 2.764+- 0.630 44.759+-17.360

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	0.144+- 0.081	2.335	0.124+- 0.012	0.861+-0.110	AL
2 SI *	0.356+- 0.202	5.772	0.369+- 0.036	1.034+-0.145	SI
3 P	0.023+- 0.005	0.379	0.007+- 0.000	0.302+-0.019	P
4 S *	0.408+- 0.125	6.610	0.408+- 0.033	1.000+-0.114	S
5 CL	0.006+- 0.006	0.050	0.016+- 0.002	2.736+-1.203	CL
6 K *	0.020+- 0.033	1.291	0.025+- 0.002	0.320+-0.025	K
7 CA *	0.050+- 0.025	0.807	0.031+- 0.002	0.614+-0.053	CA
8 TI	0.002+- 0.002	0.040	0.004+- 0.000	1.736+-0.301	TI
9 V	0.001+- 0.001	0.005	0.000+- 0.000	0.241+-0.073	V
10 CR	< 0.001	---	0.000+- 0.000	0.000+-0.000	CR
11 MN	0.002+- 0.001	0.026	0.002+- 0.000	1.282+-0.289	MN
12 FE *	0.034+- 0.021	0.551	0.056+- 0.004	1.635+-0.227	FE
13 NI	< 0.001	---	0.001+- 0.000	0.000+-0.000	NI
14 CU *	0.006+- 0.003	0.092	0.006+- 0.001	1.064+-0.133	CU
15 ZN *	0.060+- 0.019	0.978	0.047+- 0.004	0.782+-0.074	ZN
16 AS *	0.035+- 0.017	0.565	0.023+- 0.002	0.670+-0.063	AS
17 SE	0.001+- 0.001	0.006	0.001+- 0.000	0.743+-0.098	SE
18 BR *	0.006+- 0.002	0.092	0.006+- 0.002	1.002+-0.502	BR
19 SR	0.002+- 0.001	0.039	0.001+- 0.000	0.315+-0.037	SR
20 PD	0.002+- 0.002	0.014	0.001+- 0.000	0.336+-0.107	PD
21 AG	< 0.001	---	0.001+- 0.000	0.000+-0.000	AG
22 CD *	0.035+- 0.026	0.562	0.055+- 0.005	1.572+-0.268	CD
23 IN	0.007+- 0.007	0.058	0.000+- 0.000	0.012+-0.051	IN
24 SH	< 0.001	---	0.002+- 0.000	0.000+-0.000	SH
25 SB	0.012+- 0.012	0.098	0.007+- 0.001	0.618+-0.096	SB
26 BA	< 0.001	---	0.005+- 0.002	0.000+-0.000	BA
27 HG	0.001+- 0.001	0.008	0.001+- 0.000	0.742+-0.131	HG
28 PB *	0.163+- 0.053	2.643	0.170+- 0.011	1.042+-0.102	PB

MEAS. AMB. MASS (UG/M3): 6.2
* - FITTING ELEMENT

USER: E400

7.0


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MMMMM M      MMM      MMM
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  M  M      M      M
  M      M      M
  M  M  M      M
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1  M  M      MM      MMM

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LABEL: PRT005 -FORM -COPIES 1

SPOOLED: 06/22/82 14:45
STARTED: 06/22/82 14:47.0H: CE2P BY: Q

CMBDER RESULTS FOR CMB # Q07 2

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 7

ALL VALID SAMPLES

SITE: MICROWAVE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.353 0 OF F: 5

CODE SOURCE FLG UG/M3 %

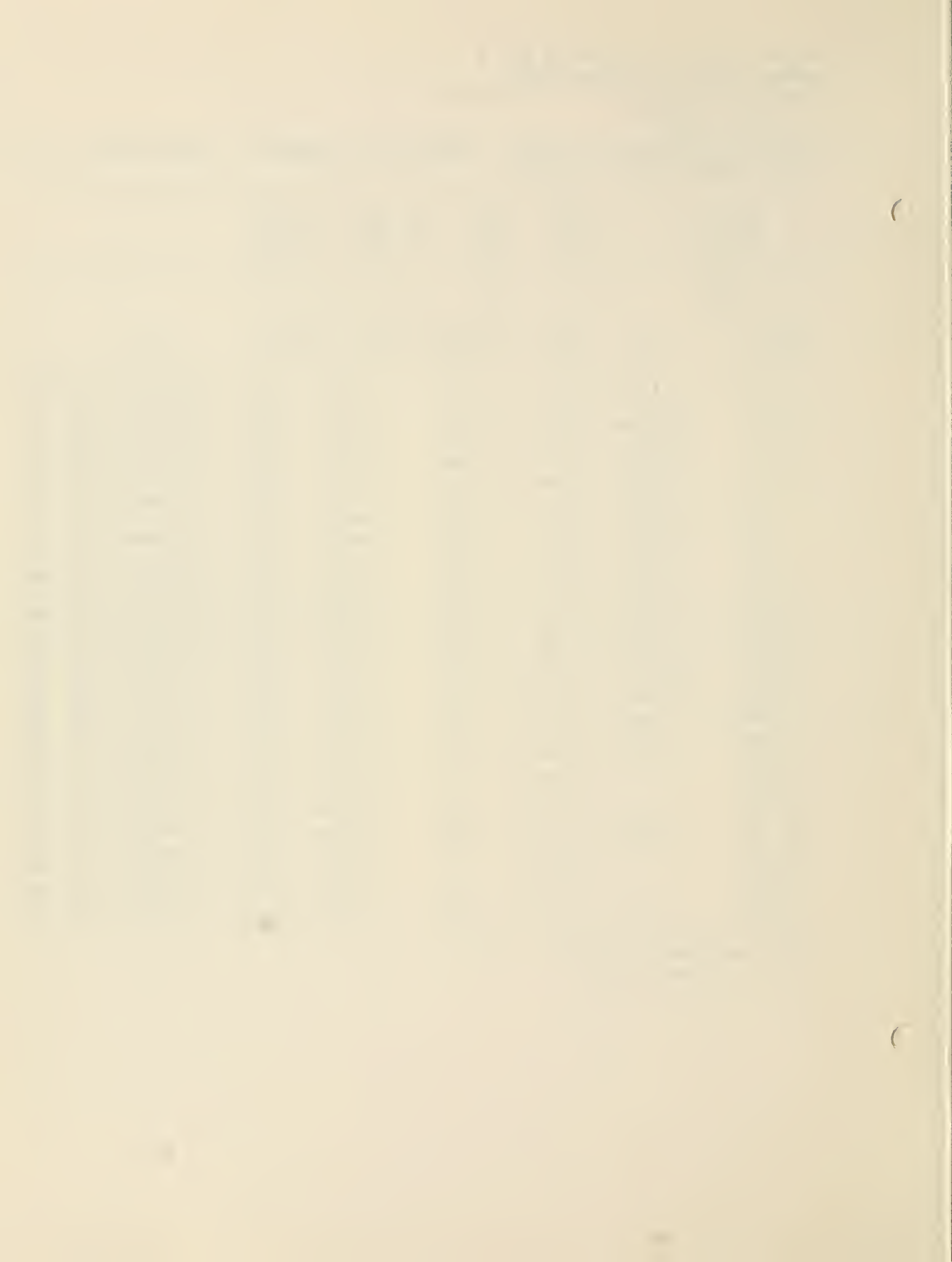
3	GEO A	*	0.831+-	0.478	22.586+-	13.623
4	GEO-B	*	1.199+-	0.689	32.594+-	19.656
68	MSSTK	*	0.065+-	0.036	1.767+-	1.040

TOTAL: 2.095+- 0.839 56.947+-25.070

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.172+-	0.040	4.675	0.143+-	0.010	0.829+-0.076 AL
2 SI *	0.493+-	0.083	13.411	0.533+-	0.038	1.081+-0.112 SI
3 P	0.015+-	0.003	0.397	0.003+-	0.000	0.222+-0.015 P
4 S	0.025+-	0.016	0.669	0.015+-	0.002	0.613+-0.076 S
5 CL	0.007+-	0.006	0.182	0.003+-	0.000	0.510+-0.042 CL
6 K *	0.038+-	0.008	1.038	0.039+-	0.003	1.011+-0.101 K
7 CA *	0.128+-	0.054	3.471	0.116+-	0.010	0.912+-0.104 CA
8 TI *	0.007+-	0.001	0.182	0.007+-	0.001	1.081+-0.111 TI
9 V	0.000+-	0.000	0.003	0.000+-	0.000	1.947+-0.297 V
10 CR	0.000+-	0.000	0.004	0.000+-	0.000	1.230+-0.131 CR
11 MN	0.002+-	0.001	0.052	0.002+-	0.000	0.813+-0.073 MN
12 FE *	0.072+-	0.017	1.971	0.062+-	0.004	0.860+-0.075 FE
13 NI	0.000+-	0.000	0.003	0.000+-	0.000	0.750+-0.114 NI
14 CU	0.004+-	0.003	0.117	0.002+-	0.000	0.359+-0.047 CU
15 ZN *	0.010+-	0.008	0.283	0.004+-	0.001	0.431+-0.054 ZN
16 AS	0.004+-	0.003	0.106	0.002+-	0.000	0.496+-0.080 AS
17 SE	0.000+-	0.000	0.011	0.000+-	0.000	0.168+-0.030 SE
18 BR	0.000+-	0.000	0.003	0.000+-	0.000	0.398+-0.058 BR
19 SR	<	0.001	---	0.000+-	0.000	0.000+-0.000 SR
20 PD	0.001+-	0.001	0.012	0.000+-	0.000	0.088+-0.046 PD
21 AG	<	0.001	---	0.000+-	0.000	0.000+-0.000 AG
22 CD	<	0.001	---	0.001+-	0.000	0.000+-0.000 CD
23 IN	0.003+-	0.003	0.037	0.000+-	0.000	0.004+-0.031 IN
24 SN	0.003+-	0.003	0.039	0.000+-	0.000	0.062+-0.039 SN
25 SB	<	0.001	---	0.001+-	0.000	0.000+-0.000 SB
26 BA	<	0.001	---	0.001+-	0.001	0.000+-0.000 BA
27 HG	<	0.001	---	0.000+-	0.000	0.000+-0.000 HG
28 PB *	0.016+-	0.010	0.432	0.019+-	0.002	1.167+-0.236 PB

MEAS. AMB. MASS (UG/M3): 3.7

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # Q07 3

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 7

ALL VALID SAMPLES

SITE: MICROWAVE

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.077 D OF F: 6

CODE SOURCE FLG UG/M3 %

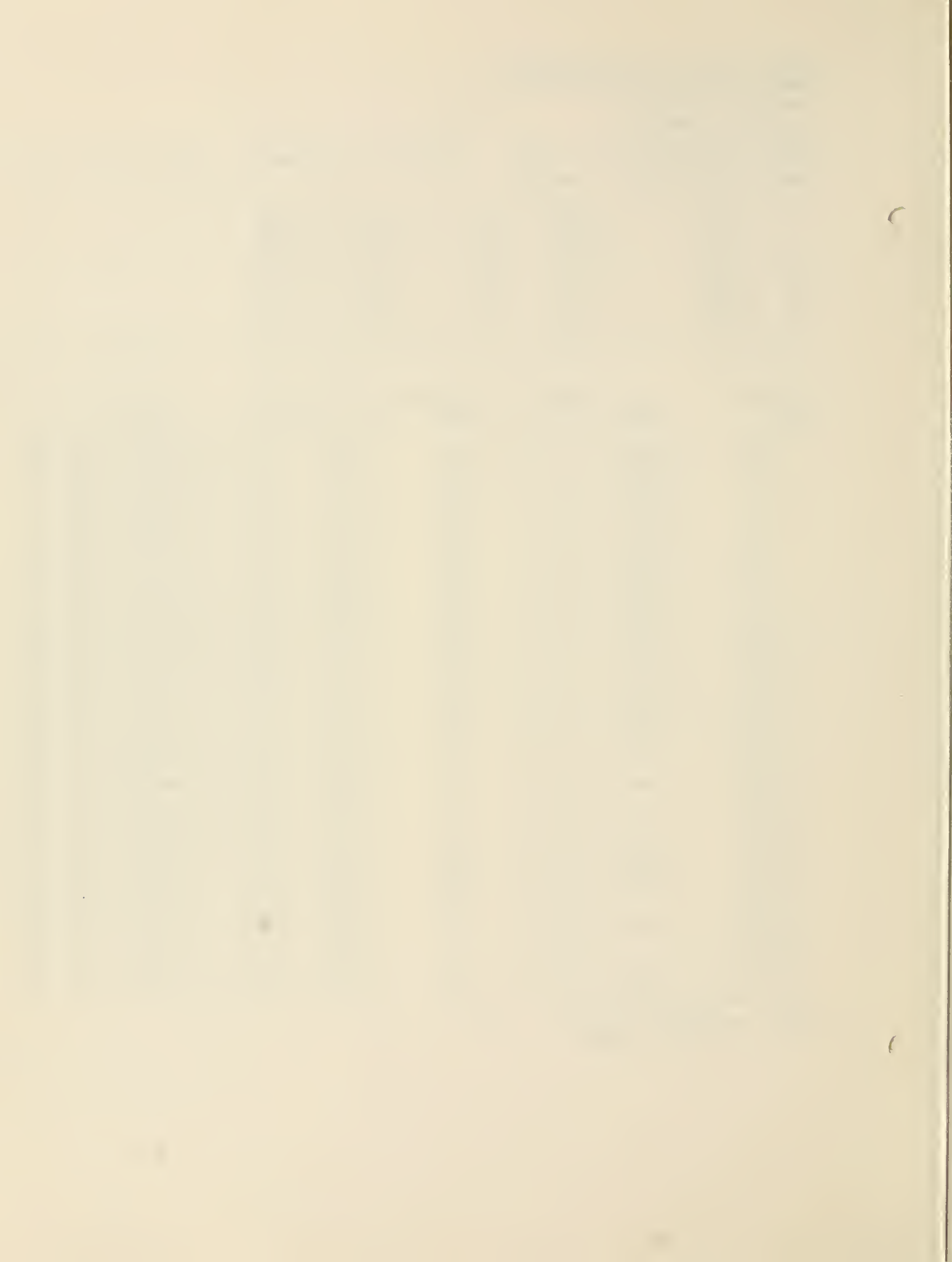
1	TRANS	*	0.024+-	0.023	0.141+-	0.282
3	GEO.A	*	8.059+-	2.179	82.130+-	53.845
26	LIME	*	0.941+-	0.880	5.321+-	10.643
43	SPISS	*	0.032+-	0.026	0.328+-	0.326
68	MSSTK	*	0.200+-	0.082	2.038+-	1.474
69	ZNSTK	*	0.038+-	0.030	0.390+-	0.383

TOTAL: 9.295+- 2.352 94.727+-61.443

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC	UG/M3	RATIO
1 AL *	0.845+-	0.451	8.611	0.783+-	0.077	0.926+-0.124 AL
2 SI *	2.509+-	1.475	25.571	2.746+-	0.271	1.095+-0.160 SI
3 P	0.030+-	0.011	0.304	0.017+-	0.002	0.554+-0.059 P
4 S	0.126+-	0.040	1.280	0.056+-	0.005	0.444+-0.045 S
5 CL	0.019+-	0.011	0.193	0.014+-	0.001	0.759+-0.067 CL
6 K *	0.173+-	0.107	1.759	0.161+-	0.016	0.934+-0.125 K
7 CA *	0.448+-	0.254	4.567	0.449+-	0.032	1.001+-0.102 CA
8 TI *	0.035+-	0.025	0.361	0.038+-	0.004	1.074+-0.154 TI
9 Y	0.002+-	0.002	0.014	0.002+-	0.000	0.794+-0.099 Y
10 CR	0.000+-	0.000	0.002	0.002+-	0.000	4.859+-2.226 CR
11 MN *	0.009+-	0.007	0.093	0.007+-	0.001	0.817+-0.092 MN
12 FE *	0.318+-	0.183	3.245	0.335+-	0.031	1.052+-0.143 FE
13 NI	0.002+-	0.001	0.019	0.001+-	0.000	0.474+-0.053 NI
14 CU *	0.016+-	0.009	0.164	0.018+-	0.001	1.107+-0.126 CU
15 ZN *	0.038+-	0.016	0.390	0.039+-	0.003	1.010+-0.104 ZN
16 AS *	0.010+-	0.002	0.100	0.009+-	0.001	0.916+-0.124 AS
17 SE	<	0.001	---	0.000+-	0.000	0.000+-0.000 SE
18 BR *	0.002+-	0.001	0.022	0.002+-	0.001	0.957+-0.404 BR
19 SR	<	0.001	---	0.002+-	0.000	0.000+-0.000 SR
20 PD	<	0.001	---	0.000+-	0.000	0.000+-0.000 PD
21 AG	0.002+-	0.002	0.015	0.001+-	0.000	0.261+-0.147 AG
22 CD	0.006+-	0.006	0.036	0.002+-	0.001	0.408+-0.110 CD
23 IN	0.004+-	0.004	0.026	0.000+-	0.001	0.017+-0.132 IN
24 SH	<	0.001	---	0.002+-	0.001	0.000+-0.000 SH
25 SB	0.012+-	0.012	0.069	0.006+-	0.001	0.494+-0.119 SB
26 BA	<	0.001	---	0.005+-	0.003	0.000+-0.000 BA
27 HG	<	0.001	---	0.000+-	0.000	0.000+-0.000 HG
28 PB *	0.062+-	0.024	0.629	0.072+-	0.008	1.164+-0.189 PB

MEAS. AMB. MASS (UG/M3): 9.8

* - FITTING ELEMENT



CMDEQ RESULTS FOR CMD # QCT 3

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 7

ALL VALID SAMPLES

SITE: MICROWAVE

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.167 D OF F: 6

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.026+-	0.024	0.144+-	0.288
3	GEO A	*	8.032+-	2.130	91.852+-	53.695
26	LIME	*	0.934+-	0.880	5.309+-	10.617
68	MSSTK	*	0.253+-	0.067	2.582+-	1.687
69	ZNSTK	*	0.034+-	0.030	0.183+-	0.366
74	CUKST	*	0.017+-	0.017	0.103+-	0.206

TOTAL: 9.296+- 2.352 94.734+-61.447

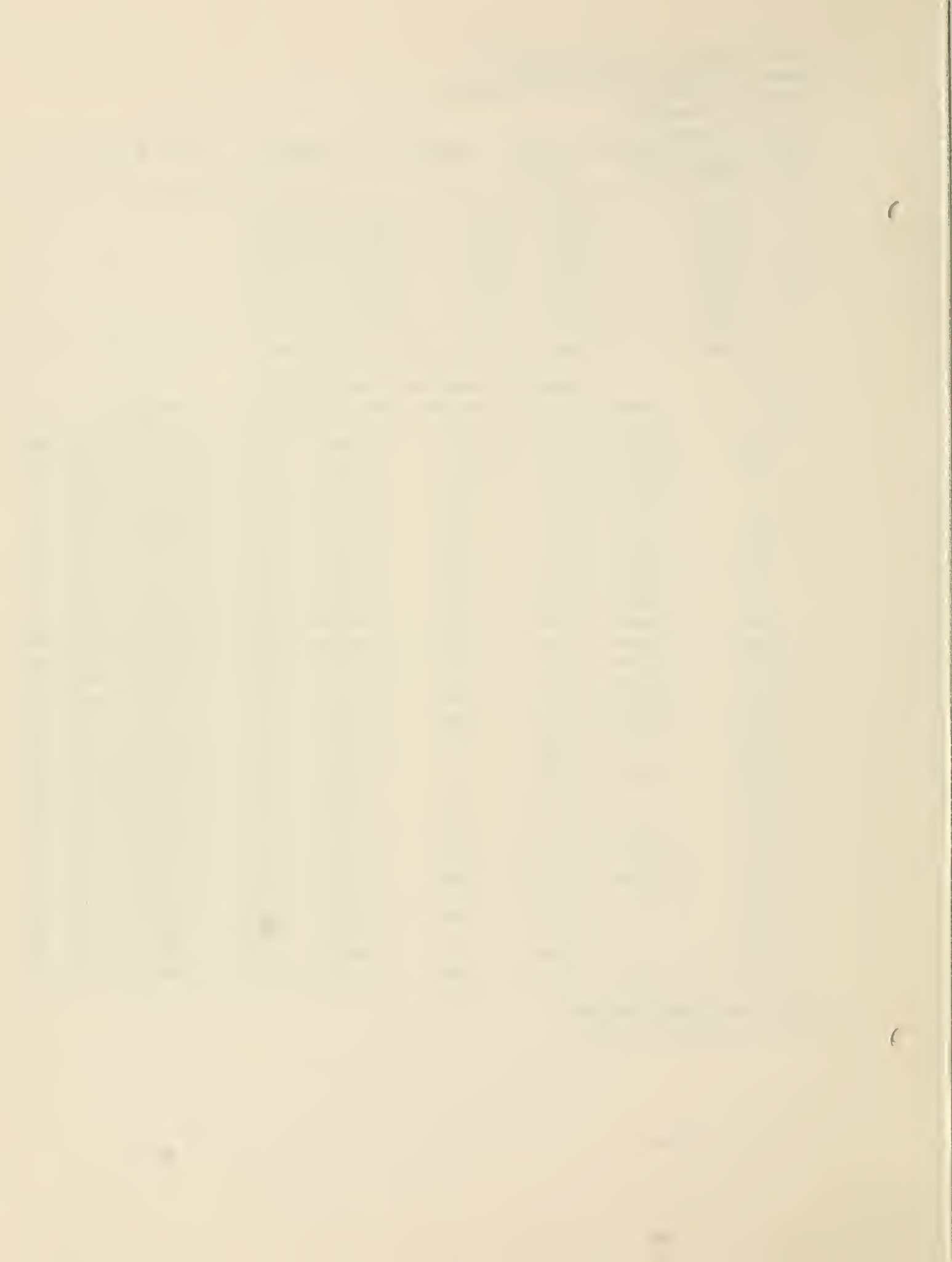
SPECIE CODE MEAS. UG/M3 COARSE SUSPENDED PARTICULATE PERCENT CALC. UG/M3

RATIO

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 AL *	0.845+- 0.451	8.611	0.780+- 0.077	0.924+-0.123 AL
2 SI *	2.509+- 1.475	25.571	2.738+- 0.270	1.091+-0.159 SI
3 P	0.030+- 0.011	0.304	0.017+- 0.002	0.564+-0.059 P
4 S	0.126+- 0.040	1.280	0.063+- 0.006	0.503+-0.056 S
5 CL	0.019+- 0.011	0.193	0.015+- 0.001	0.801+-0.071 CL
6 K *	0.173+- 0.107	1.759	0.161+- 0.016	0.933+-0.125 K
7 CA *	0.448+- 0.254	4.567	0.448+- 0.032	1.001+-0.101 CA
8 TI *	0.035+- 0.025	0.361	0.038+- 0.004	1.073+-0.153 TI
9 V	0.002+- 0.002	0.014	0.002+- 0.000	0.792+-0.098 V
10 CR	0.000+- 0.000	0.002	0.002+- 0.000	4.917+-2.258 CR
11 MN *	0.009+- 0.007	0.093	0.008+- 0.001	0.842+-0.095 MN
12 FE *	0.318+- 0.183	3.245	0.337+- 0.031	1.059+-0.143 FE
13 NI	0.002+- 0.001	0.019	0.001+- 0.000	0.388+-0.052 NI
14 CU *	0.016+- 0.009	0.164	0.016+- 0.001	0.999+-0.105 CU
15 ZN *	0.038+- 0.016	0.390	0.039+- 0.003	1.014+-0.107 ZN
16 AS *	0.010+- 0.002	0.100	0.008+- 0.001	0.855+-0.148 AS
17 SE	< 0.001	---	0.000+- 0.000	0.000+-0.000 SE
18 BR *	0.002+- 0.001	0.022	0.002+- 0.001	0.923+-0.418 BR
19 SR	< 0.001	---	0.002+- 0.000	0.000+-0.000 SR
20 PD	< 0.001	---	0.000+- 0.000	0.000+-0.000 PD
21 AG	0.002+- 0.002	0.015	0.001+- 0.000	0.242+-0.152 AG
22 CD	0.006+- 0.006	0.036	0.003+- 0.001	0.493+-0.126 CD
23 IN	0.004+- 0.004	0.026	0.000+- 0.001	0.011+-0.132 IN
24 SN	< 0.001	---	0.001+- 0.001	0.000+-0.000 SN
25 SB	0.012+- 0.012	0.069	0.005+- 0.001	0.464+-0.125 SB
26 BA	< 0.001	---	0.005+- 0.003	0.000+-0.000 BA
27 HG	< 0.001	---	0.000+- 0.000	0.000+-0.000 HG
28 PB *	0.062+- 0.024	0.629	0.080+- 0.010	1.301+-0.254 PB

MEAS. AMB. MASS (UG/M3): 9.2

* - FITTING ELEMENT



USER: E400

VS F

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LABEL: PRT014 -FORM -COPIES 1

SPOOLED: 06/22/82 14:49
STARTED: 06/22/82 14:56, ON: CE2P BY: Q

CMDBEQ RESULTS FOR CMB # QF9 2

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 9

ALL VALID SAMPLES

SITE: MUFFICK

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.556 D OF F: 8
CODE SOURCE FLG UG/M3 %

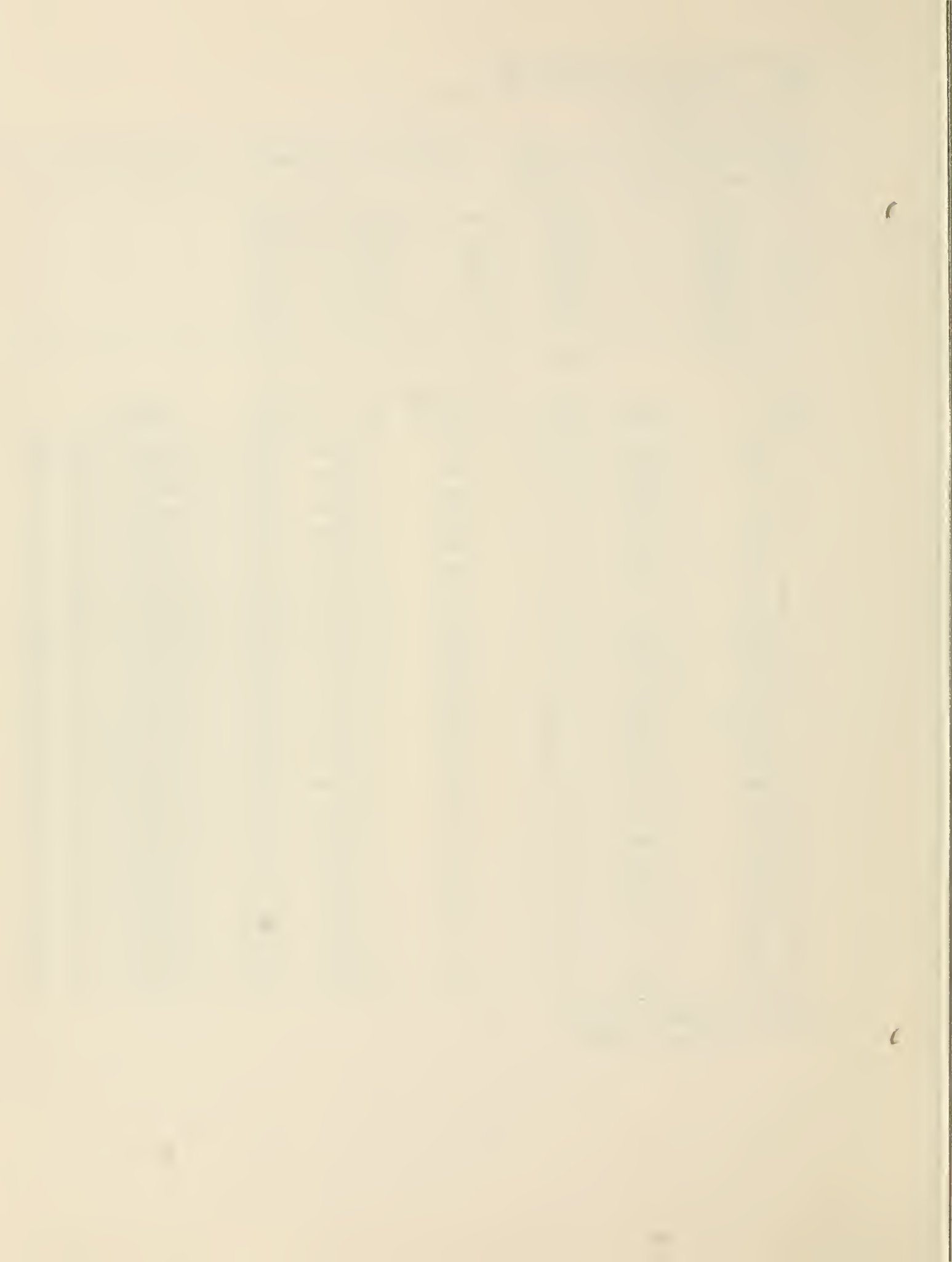
1	TRANS	*	0.195+-	0.106	3.452+-	1.935
14	GEO-L	*	1.943+-	0.137	34.394+-	5.140
65	DRBLD	*	0.095+-	0.088	1.681+-	1.577
67	BLFUP	*	0.255+-	0.098	4.513+-	1.841
74	CUKST	*	0.253+-	0.173	4.471+-	3.125
77	SECSO	*	0.927+-	0.259	16.393+-	5.068

TOTAL: 3.668+- 0.381 64.910+-10.881

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.191+-	0.023	3.373	0.200+-	0.020	1.049+-0.151 AL
2 SI *	0.517+-	0.052	9.143	0.578+-	0.058	1.120+-0.167 SI
3 P	0.023+-	0.004	0.404	0.010+-	0.001	0.440+-0.036 P
4 S *	0.328+-	0.055	5.814	0.328+-	0.023	1.000+-0.101 S
5 CL	0.015+-	0.011	0.260	0.022+-	0.003	1.469+-0.340 CL
6 K *	0.045+-	0.004	0.795	0.044+-	0.004	0.976+-0.116 K
7 CA *	0.115+-	0.024	2.044	0.074+-	0.007	0.637+-0.070 CA
8 TI *	0.007+-	0.001	0.122	0.007+-	0.001	1.066+-0.152 TI
9 W	<	0.001	---	0.000+-	0.000	0.000+-0.000 W
10 CR	0.002+-	0.001	0.041	0.001+-	0.000	0.275+-0.044 CR
11 MN *	0.003+-	0.001	0.051	0.003+-	0.000	0.914+-0.121 MN
12 FE *	0.101+-	0.013	1.780	0.095+-	0.009	0.940+-0.127 FE
13 NI	0.001+-	0.001	0.025	0.001+-	0.000	0.929+-0.110 NI
14 CU *	0.143+-	0.093	2.533	0.151+-	0.014	1.057+-0.140 CU
15 ZH *	0.127+-	0.057	2.257	0.086+-	0.007	0.675+-0.063 ZH
16 AS *	0.067+-	0.050	1.180	0.069+-	0.006	1.033+-0.121 AS
17 SE	0.002+-	0.001	0.032	0.001+-	0.000	0.311+-0.048 SE
18 BR *	0.013+-	0.005	0.228	0.014+-	0.005	1.093+-0.583 BR
19 SR	0.002+-	0.001	0.034	0.001+-	0.000	0.351+-0.067 SR
20 PD	0.001+-	0.001	0.012	0.003+-	0.000	2.258+-0.721 PD
21 AG	0.002+-	0.002	0.021	0.002+-	0.000	0.744+-0.247 AG
22 CD *	0.038+-	0.022	0.673	0.044+-	0.004	1.165+-0.173 CD
23 IH	0.003+-	0.003	0.029	0.000+-	0.001	0.030+-0.224 IH
24 SN	0.008+-	0.005	0.140	0.004+-	0.001	0.458+-0.126 SN
25 SB	0.010+-	0.010	0.088	0.006+-	0.002	0.612+-0.236 SB
26 BA	<	0.001	---	0.002+-	0.004	0.000+-0.000 BA
27 HG	0.001+-	0.001	0.010	0.001+-	0.000	0.853+-0.197 HG
28 PB *	0.189+-	0.071	3.341	0.189+-	0.013	1.003+-0.100 PB

MEAS. AMB. MASS (UG/M3): 5.7

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF9 20

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 9

CO-COLLECTED SAMPLES

SITE: MUFFICK

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.650 D OF F: 9

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.226+-	0.120	3.893+-	2.145
14	GED-L	*	1.975+-	0.149	34.054+-	5.679
65	DRBLD	*	0.113+-	0.102	1.953+-	1.776
67	BLFUP	*	0.300+-	0.109	5.181+-	2.035
74	CUKST	*	0.305+-	0.190	5.251+-	3.375
77	SECSO	*	0.849+-	0.295	14.647+-	5.532

TOTAL: 3.763+- 0.427 64.979+-12.143

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.193+-	0.028	3.331	0.203+-	0.020	1.053+-0.151 AL
2 SI *	0.506+-	0.061	8.731	0.588+-	0.058	1.162+-0.177 SI
3 P	0.025+-	0.005	0.426	0.011+-	0.001	0.433+-0.034 P
4 S *	0.322+-	0.065	5.557	0.322+-	0.022	1.000+-0.096 S
5 CL	0.017+-	0.013	0.297	0.025+-	0.003	1.449+-0.337 CL
6 K *	0.047+-	0.004	0.803	0.046+-	0.004	0.980+-0.114 K
7 CA *	0.125+-	0.026	2.162	0.076+-	0.007	0.606+-0.065 CA
8 TI *	0.007+-	0.002	0.117	0.008+-	0.001	1.104+-0.160 TI
9 V	<	0.001	---	0.000+-	0.000	0.000+-0.000 V
10 CR	0.003+-	0.001	0.047	0.001+-	0.000	0.244+-0.038 CR
11 MN *	0.003+-	0.001	0.050	0.003+-	0.000	0.942+-0.127 MN
12 FE *	0.106+-	0.014	1.829	0.096+-	0.009	0.909+-0.120 FE
13 NI *	0.002+-	0.001	0.028	0.001+-	0.000	0.922+-0.102 NI
14 CU *	0.166+-	0.107	2.859	0.180+-	0.017	1.084+-0.147 CU
15 ZN *	0.148+-	0.062	2.555	0.091+-	0.007	0.615+-0.054 ZN
16 AS *	0.078+-	0.058	1.341	0.081+-	0.007	1.042+-0.124 AS
17 SE	0.002+-	0.001	0.036	0.001+-	0.000	0.296+-0.043 SE
18 BR *	0.015+-	0.005	0.253	0.016+-	0.006	1.101+-0.594 BR
19 SR	0.001+-	0.001	0.010	0.001+-	0.000	0.636+-0.132 SR
20 PD	0.002+-	0.002	0.014	0.004+-	0.000	2.340+-0.702 PD
21 AG	0.003+-	0.003	0.024	0.002+-	0.000	0.721+-0.214 AG
22 CD *	0.044+-	0.024	0.764	0.052+-	0.005	1.175+-0.175 CD
23 IN	<	0.001	---	0.000+-	0.001	0.000+-0.000 IN
24 SN	0.009+-	0.006	0.159	0.004+-	0.001	0.430+-0.110 SN
25 SB	0.011+-	0.011	0.100	0.007+-	0.002	0.621+-0.216 SB
26 BA	<	0.001	---	0.003+-	0.005	0.000+-0.000 BA
27 HG	0.001+-	0.001	0.010	0.001+-	0.000	0.875+-0.189 HG
28 PB *	0.215+-	0.078	3.700	0.216+-	0.016	1.008+-0.103 PB

MEAS. AMB. MASS (UG/M3): 5.8

* - FITTING ELEMENT



USER: E400

9 C


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LABEL: PRT011 -FORM -COPIES 1

SPOOLED: 06/22/82 14:49

STARTED: 06/22/82 14:53, ON: CE2P BY: Q



CMDEDQ RESULTS FOR CMB # QCS 2

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 9

ALL VALID SAMPLES

SITE: MUFFICK

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.330 D OF F: 9

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.021+- 0.016	0.267+- 0.217
14	GEO-L	*	4.677+- 0.476	59.532+-15.285
73	ZNKLD	*	0.060+- 0.052	0.761+- 0.691
74	CUKST	*	0.410+- 0.357	5.223+- 4.719

TOTAL: 5.168+- 0.597 65.783+-17.919

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO
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1	AL *	0.335+- 0.077	4.269	0.396+- 0.039	1.181+-0.182	AL
2	SI *	1.229+- 0.267	15.644	1.323+- 0.132	1.076+-0.158	SI
3	P	0.016+- 0.004	0.204	0.011+- 0.001	0.717+-0.082	P
4	S	0.099+- 0.020	1.256	0.080+- 0.006	0.812+-0.082	S
5	CL	0.005+- 0.004	0.069	0.013+- 0.001	2.495+-0.558	CL
6	K *	0.089+- 0.023	1.129	0.094+- 0.009	1.054+-0.151	K
7	CA *	0.250+- 0.065	3.182	0.163+- 0.016	0.650+-0.076	CA
8	TI *	0.021+- 0.005	0.271	0.021+- 0.002	0.988+-0.138	TI
9	V	0.002+- 0.001	0.023	0.001+- 0.000	0.653+-0.093	V
10	CR	0.002+- 0.001	0.020	0.002+- 0.000	0.978+-0.131	CR
11	MN *	0.007+- 0.003	0.089	0.007+- 0.001	0.955+-0.131	MN
12	FE *	0.253+- 0.062	3.218	0.244+- 0.024	0.964+-0.134	FE
13	NI	0.002+- 0.001	0.031	0.002+- 0.000	0.828+-0.074	NI
14	CU *	0.287+- 0.192	3.650	0.298+- 0.023	1.041+-0.118	CU
15	ZN *	0.094+- 0.032	1.193	0.097+- 0.007	1.036+-0.107	ZN
16	AS *	0.010+- 0.005	0.130	0.009+- 0.001	0.922+-0.116	AS
17	SE	0.001+- 0.000	0.008	0.000+- 0.000	0.806+-0.113	SE
18	BR *	0.002+- 0.001	0.032	0.003+- 0.001	1.018+-0.317	BR
19	SR	0.002+- 0.001	0.020	0.002+- 0.000	1.257+-0.197	SR
20	PD	< 0.001	---	0.000+- 0.000	0.000+-0.000	PD
21	AG	0.001+- 0.001	0.010	0.001+- 0.000	0.672+-0.338	AG
22	CD *	0.004+- 0.004	0.024	0.003+- 0.001	0.806+-0.245	CD
23	IN	< 0.001	---	0.000+- 0.001	0.000+-0.000	IN
24	SN	0.003+- 0.003	0.020	0.003+- 0.001	0.907+-0.339	SN
25	SB	0.008+- 0.008	0.052	0.004+- 0.002	0.539+-0.219	SB
26	BA	0.012+- 0.012	0.081	0.000+- 0.003	0.004+-0.283	BA
27	HG	0.001+- 0.001	0.015	0.000+- 0.000	0.325+-0.124	HG
28	PB *	0.128+- 0.050	1.629	0.092+- 0.008	0.717+-0.078	PB

MEAS. AMB. MASS (UG/M3): 7.9

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # 909 20

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 9

CO-COLLECTED SAMPLES

SITE: MUFFICK

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.382 D OF F: 9
CODE SOURCE FLG UG/M3 %

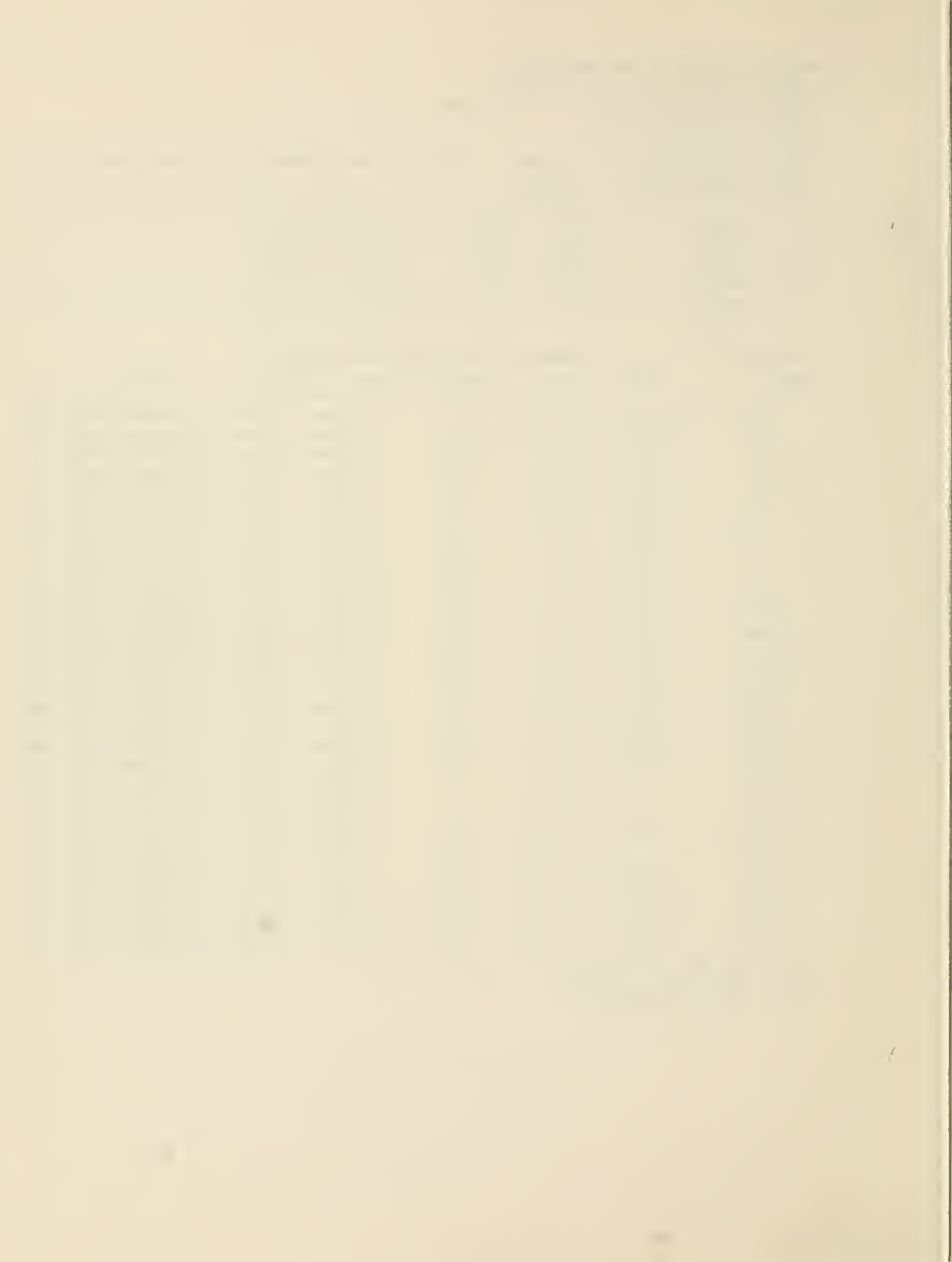
1	TRANS	*	0.019+- 0.017	0.225+- 0.210
14	GEO-L	*	5.089+- 0.528	59.518+-16.127
73	ZNKLD	*	0.076+- 0.056	0.886+- 0.688
74	CUKST	*	0.487+- 0.411	5.693+- 5.012

TOTAL: 5.671+- 0.671 66.322+-18.365

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 AL *	0.361+- 0.086	4.217	0.431+- 0.043	1.196+-0.186 AL
2 SI *	1.314+- 0.300	15.364	1.439+- 0.144	1.096+-0.162 SI
3 P	0.017+- 0.004	0.202	0.013+- 0.001	0.727+-0.082 P
4 S	0.107+- 0.021	1.254	0.089+- 0.007	0.834+-0.083 S
5 CL	0.006+- 0.004	0.074	0.016+- 0.001	2.463+-0.542 CL
6 K *	0.098+- 0.025	1.150	0.102+- 0.010	1.037+-0.147 K
7 CA *	0.275+- 0.071	3.219	0.177+- 0.017	0.644+-0.075 CA
8 TI *	0.023+- 0.006	0.264	0.023+- 0.002	1.014+-0.144 TI
9 V	0.002+- 0.001	0.025	0.001+- 0.000	0.610+-0.085 V
10 CR	0.002+- 0.001	0.021	0.002+- 0.000	0.950+-0.125 CR
11 MN *	0.007+- 0.003	0.088	0.007+- 0.001	0.969+-0.134 MN
12 FE *	0.277+- 0.067	3.243	0.265+- 0.026	0.957+-0.132 FE
13 NI	0.003+- 0.001	0.032	0.002+- 0.000	0.835+-0.074 NI
14 CU *	0.331+- 0.221	3.869	0.346+- 0.028	1.047+-0.121 CU
15 ZN *	0.108+- 0.034	1.262	0.112+- 0.008	1.042+-0.107 ZN
16 AS *	0.012+- 0.005	0.139	0.010+- 0.001	0.871+-0.106 AS
17 SE	0.001+- 0.000	0.008	0.001+- 0.000	0.813+-0.109 SE
18 BR *	0.002+- 0.001	0.029	0.003+- 0.001	1.022+-0.293 BR
19 SR	0.002+- 0.001	0.022	0.002+- 0.000	1.154+-0.172 SR
20 PD	< 0.001	---	0.000+- 0.000	0.000+-0.000 PD
21 AG	< 0.001	---	0.001+- 0.000	0.000+-0.000 AG
22 CD *	0.004+- 0.004	0.027	0.003+- 0.001	0.747+-0.218 CD
23 IN	< 0.001	---	0.000+- 0.001	0.000+-0.000 IN
24 SH	0.003+- 0.003	0.021	0.003+- 0.001	0.860+-0.309 SH
25 SB	0.009+- 0.009	0.056	0.005+- 0.002	0.509+-0.203 SB
26 BA	0.014+- 0.014	0.087	0.000+- 0.004	0.004+-0.263 BA
27 HG	0.001+- 0.001	0.005	0.000+- 0.000	0.482+-0.190 HG
28 PS *	0.147+- 0.055	1.725	0.101+- 0.009	0.682+-0.072 PS

MEAS. AMB. MASS (UG/M3): 8.6

* - FITTING ELEMENT



USER: E400

10 T


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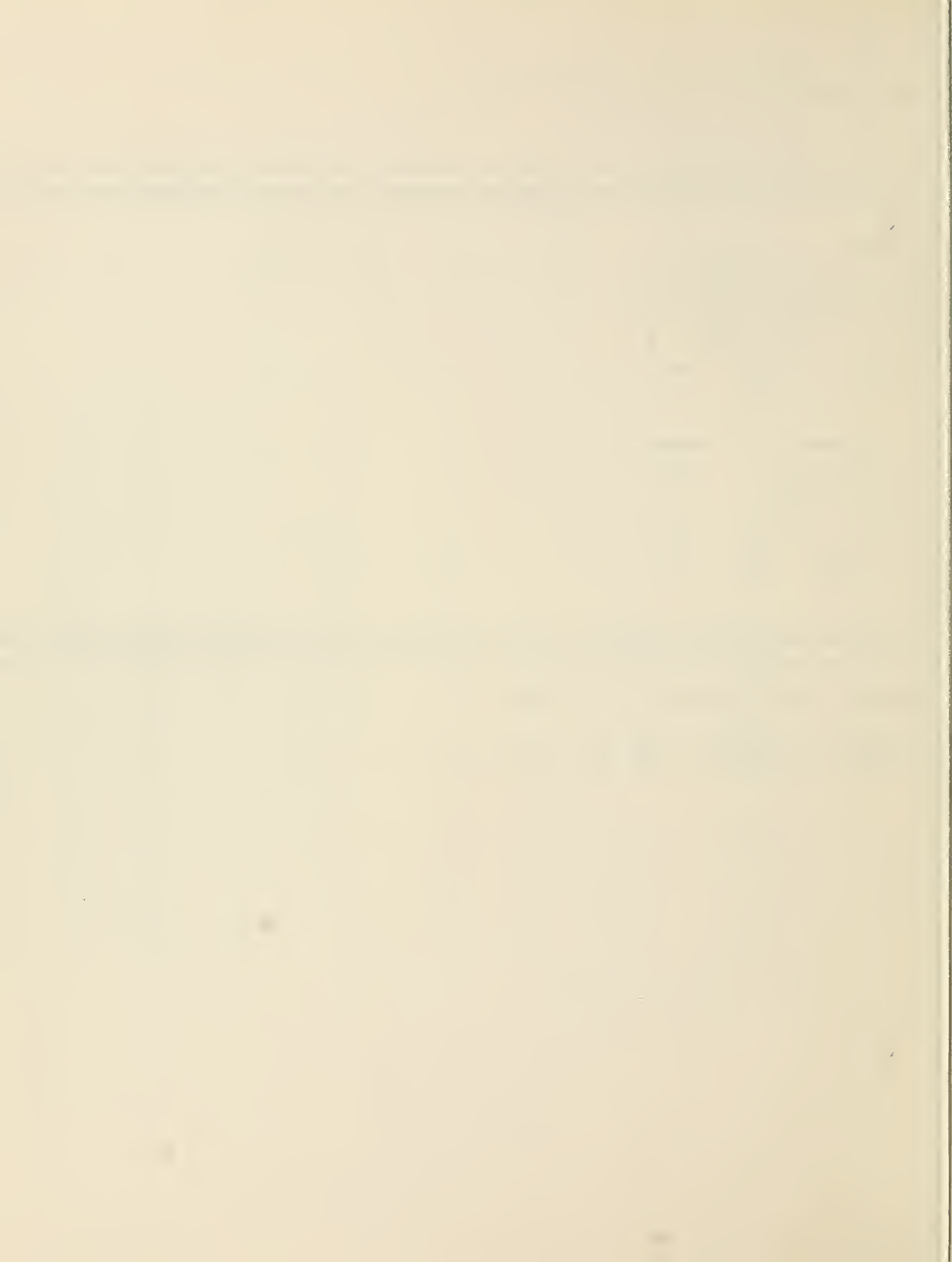
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LABEL: PRT017 -FORM -COPIES 1

REFILED: 06/22/82 14:50
STARTED: 06/22/82 14:59, ON: CE2P BY: Q



CMBOEQ RESULTS FOR CMB # QT9.2

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 9

ALL VALID SAMPLES

SITE: MUFFICK

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.720 D OF F: 5
CODE SOURCE FLG UG/M3 %

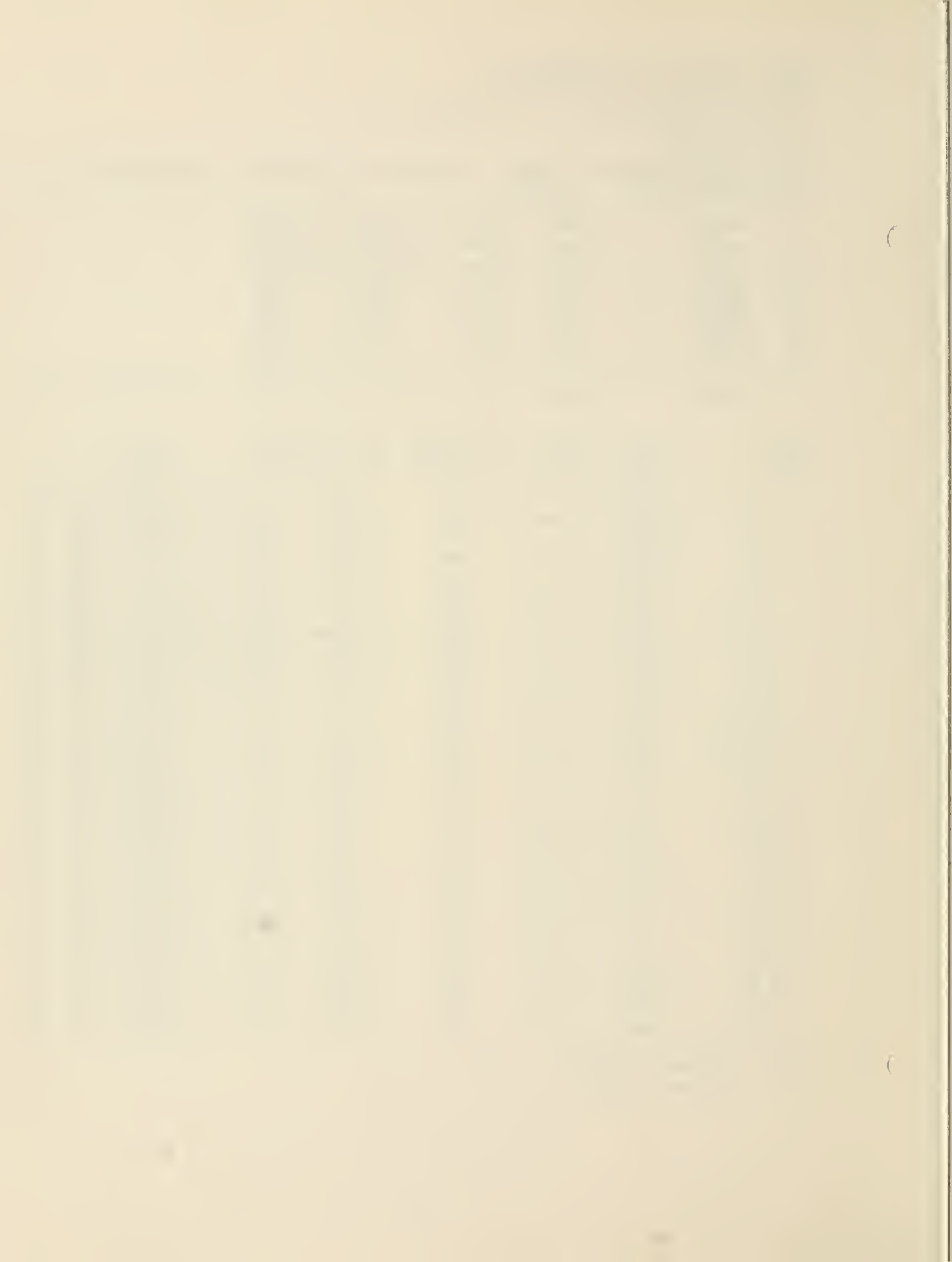
1	TRANS	*	0.384+-	0.209	0.933+-	0.515
14	GEO-L	*	15.705+-	3.094	32.110+-	8.229
36	COAL1	*	9.709+-	5.009	23.560+-	12.333
47	SLAGM	*	1.222+-	0.516	2.965+-	1.280
65	DRBLD	*	0.463+-	0.485	0.591+-	1.182
67	BLFUP	*	1.010+-	0.609	2.451+-	1.495
73	ZNKLD	*	0.479+-	0.303	1.163+-	0.742
74	CUKST	*	1.365+-	1.004	3.313+-	2.453

TOTAL: 30.337+- 6.057 73.617+-16.073

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	1.550+-	0.181	3.762	1.824+-	0.137	1.176+-0.137 AL
2 SI *	5.591+-	0.642	13.567	5.969+-	0.472	1.068+-0.123 SI
3 P	0.080+-	0.011	0.193	0.054+-	0.003	0.679+-0.052 P
4 S	0.769+-	0.167	1.866	0.438+-	0.025	0.570+-0.038 S
5 CL	0.065+-	0.023	0.159	0.093+-	0.011	1.412+-0.285 CL
6 K *	0.398+-	0.049	0.967	0.341+-	0.027	0.857+-0.088 K
7 CA *	1.146+-	0.173	2.782	1.024+-	0.064	0.893+-0.074 CA
8 TI *	0.093+-	0.012	0.225	0.083+-	0.006	0.891+-0.093 TI
9 V	0.008+-	0.001	0.020	0.005+-	0.000	0.653+-0.066 V
10 CR	0.005+-	0.001	0.012	0.007+-	0.000	1.338+-0.138 CR
11 MH *	0.034+-	0.006	0.084	0.037+-	0.002	1.062+-0.105 MH
12 FE *	1.156+-	0.142	2.806	1.119+-	0.078	0.968+-0.094 FE
13 NI	0.009+-	0.003	0.022	0.009+-	0.000	0.972+-0.073 NI
14 CU *	1.188+-	0.531	2.883	1.216+-	0.086	1.024+-0.103 CU
15 ZN *	0.651+-	0.178	1.581	0.654+-	0.037	1.003+-0.080 ZN
16 AS *	0.175+-	0.112	0.425	0.172+-	0.014	0.982+-0.115 AS
17 SE	0.004+-	0.001	0.010	0.004+-	0.000	0.929+-0.093 SE
18 BR *	0.031+-	0.009	0.076	0.031+-	0.010	0.995+-0.449 BR
19 SR	0.010+-	0.003	0.024	0.011+-	0.001	1.140+-0.111 SR
20 PD	0.002+-	0.002	0.003	0.008+-	0.001	3.787+-1.789 PD
21 AG	0.012+-	0.006	0.029	0.007+-	0.001	0.624+-0.114 AG
22 CD *	0.113+-	0.086	0.273	0.121+-	0.010	1.073+-0.136 CD
23 IN	<	0.001	---	0.002+-	0.002	0.000+-0.000 IN
24 SH	0.029+-	0.014	0.072	0.017+-	0.002	0.583+-0.082 SH
25 SB	0.027+-	0.012	0.065	0.033+-	0.004	1.240+-0.263 SB
26 BA	0.096+-	0.049	0.234	0.025+-	0.009	0.263+-0.094 BA
27 HG	0.001+-	0.001	0.002	0.003+-	0.000	2.039+-0.738 HG
28 PB *	0.861+-	0.322	2.089	0.920+-	0.052	1.068+-0.089 PB

MEAS. AMB. MASS (UG/M3): 41.2

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # Q19 2

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 9

ALL VALID SAMPLES

SITE: MUFFICK

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.804 D OF F: 6

CODE SOURCE FLG UG/M3 %

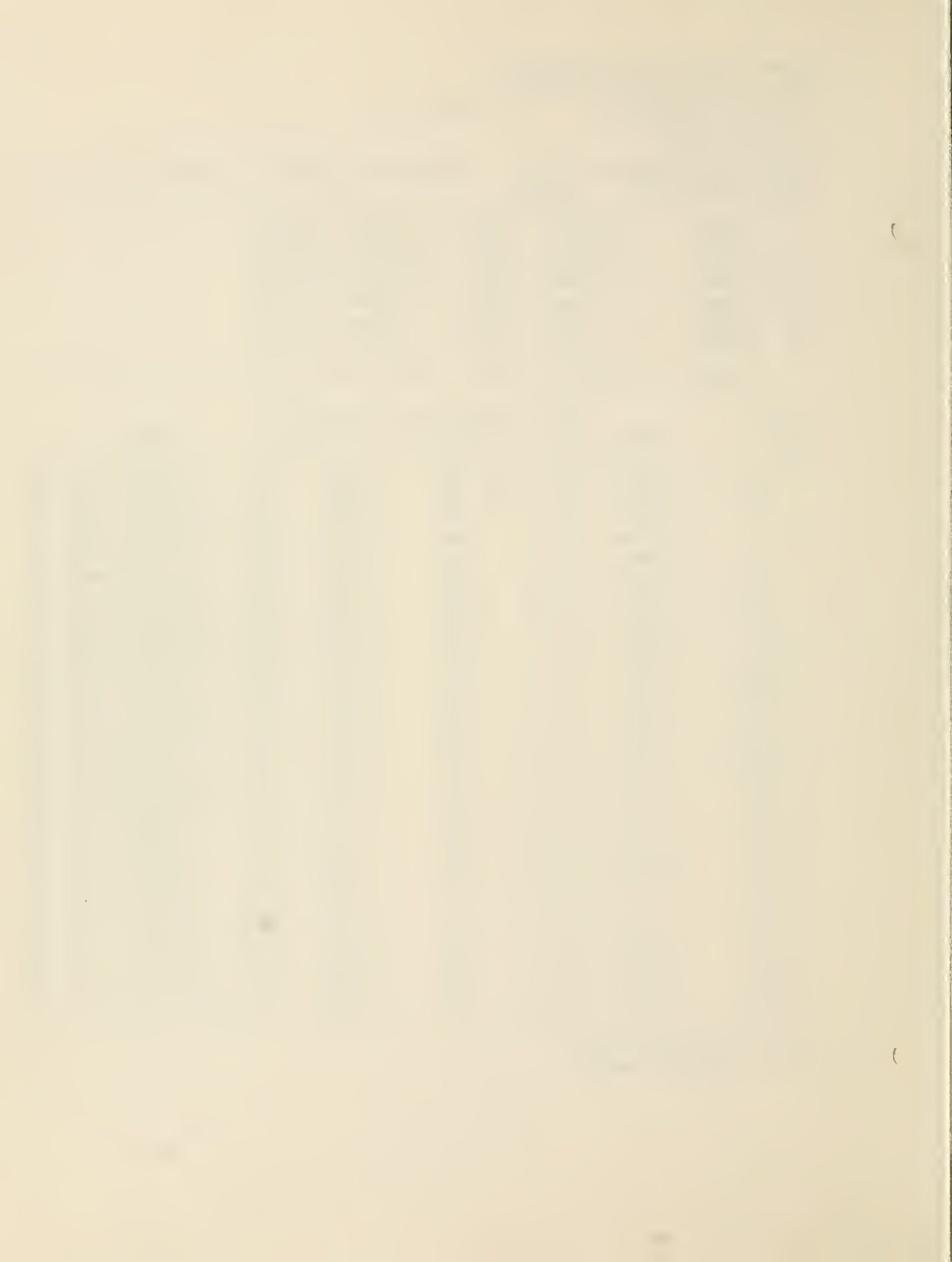
1	TRANS	*	0.381+-	0.208	0.924+-	0.512
14	GEO-L	*	15.670+-	3.093	38.024+-	8.224
36	COAL1	*	9.732+-	5.009	23.617+-	12.333
47	SLAGM	*	1.235+-	0.516	2.996+-	1.280
67	BLFUP	*	1.190+-	0.582	2.889+-	1.434
73	ZNKLD	*	0.477+-	0.303	1.158+-	0.742
74	CUKST	*	1.386+-	1.004	3.364+-	2.454

TOTAL:			30.071+-	6.034	72.971+-	16.000
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	1.550+-	0.181	3.762	1.822+-	0.137	1.176+-0.137 AL
2 SI *	5.591+-	0.642	13.567	5.962+-	0.471	1.066+-0.123 SI
3 P	0.080+-	0.011	0.193	0.055+-	0.003	0.692+-0.052 P
4 S	0.769+-	0.167	1.866	0.465+-	0.028	0.604+-0.043 S
5 CL	0.065+-	0.023	0.159	0.100+-	0.012	1.529+-0.349 CL
6 K *	0.398+-	0.049	0.967	0.344+-	0.027	0.863+-0.088 K
7 CA *	1.146+-	0.173	2.782	1.022+-	0.064	0.892+-0.074 CA
8 TI *	0.093+-	0.012	0.225	0.083+-	0.006	0.891+-0.092 TI
9 V	0.008+-	0.001	0.020	0.005+-	0.000	0.653+-0.066 V
10 CR	0.005+-	0.001	0.012	0.007+-	0.000	1.334+-0.138 CR
11 MN *	0.034+-	0.006	0.084	0.037+-	0.003	1.063+-0.106 MN
12 FE *	1.156+-	0.142	2.806	1.120+-	0.078	0.969+-0.094 FE
13 NI	0.009+-	0.003	0.022	0.009+-	0.000	0.946+-0.072 NI
14 CU *	1.188+-	0.531	2.883	1.215+-	0.087	1.023+-0.104 CU
15 ZH *	0.651+-	0.178	1.581	0.658+-	0.037	1.010+-0.080 ZH
16 AS *	0.175+-	0.112	0.425	0.066+-	0.004	0.377+-0.025 AS
17 SE	0.004+-	0.001	0.010	0.004+-	0.000	0.857+-0.091 SE
18 BR *	0.031+-	0.009	0.076	0.031+-	0.010	0.993+-0.445 BR
19 SR	0.010+-	0.003	0.024	0.011+-	0.001	1.148+-0.111 SR
20 PD	0.002+-	0.002	0.003	0.003+-	0.001	1.511+-0.708 PD
21 AG	0.012+-	0.006	0.029	0.005+-	0.001	0.448+-0.104 AG
22 CD *	0.113+-	0.086	0.273	0.134+-	0.012	1.186+-0.169 CD
23 IN	<	0.001	---	0.001+-	0.002	0.000+-0.000 IN
24 SH	0.029+-	0.014	0.072	0.012+-	0.002	0.410+-0.074 SH
25 SB	0.027+-	0.012	0.065	0.021+-	0.004	0.798+-0.192 SB
26 BA	0.096+-	0.049	0.234	0.025+-	0.009	0.262+-0.094 BA
27 HG	0.001+-	0.001	0.002	0.002+-	0.000	1.717+-0.664 HG
28 PB *	0.861+-	0.322	2.089	0.933+-	0.059	1.084+-0.100 PB

MEAS. AMB. MASS (UG/M3): 41.2

* - FITTING ELEMENT



557. 11400

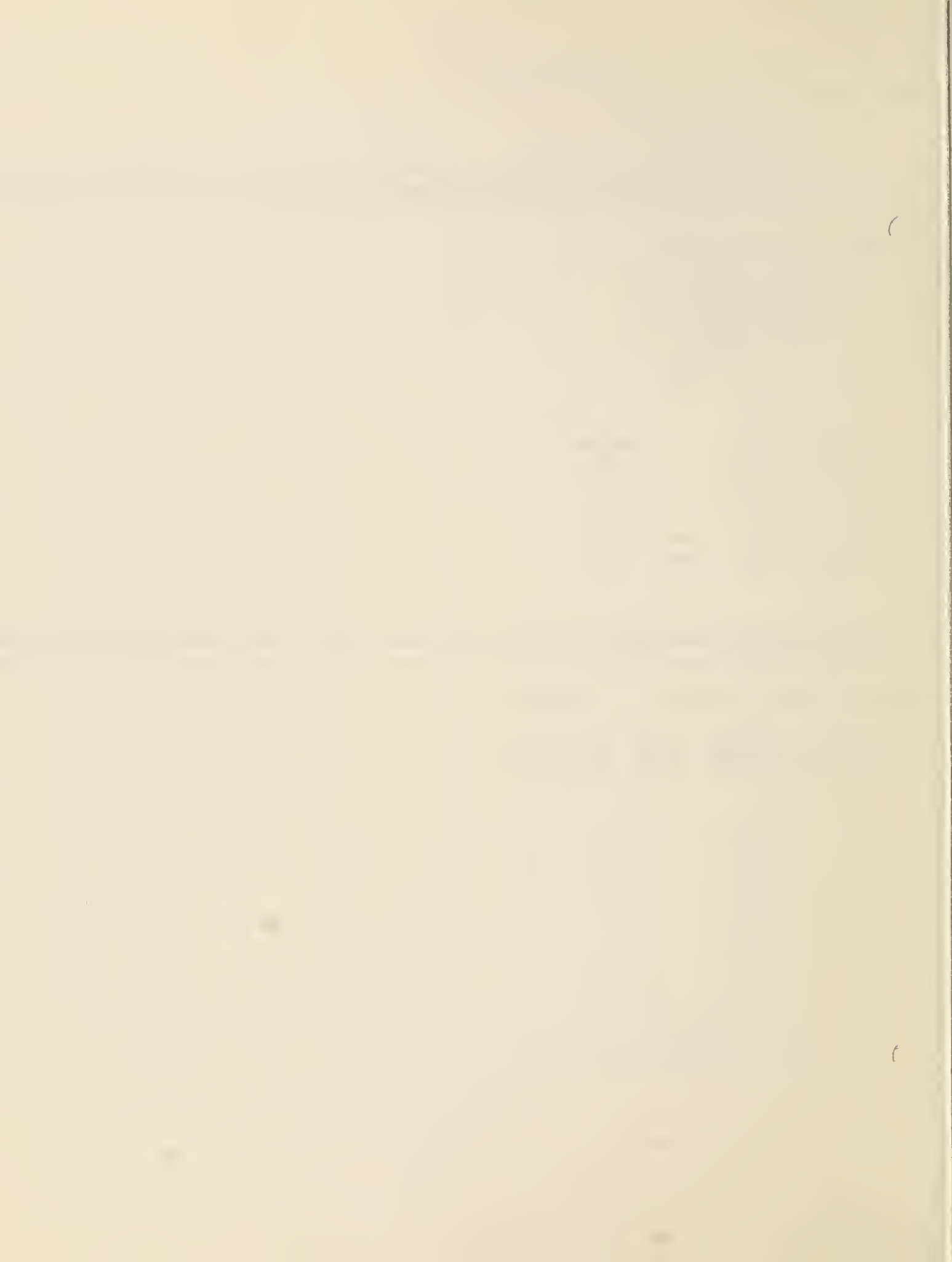
• 227

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466
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LABEL: PRT001 -FORM -COPIES 1

SPOOLED: 06/22/82 15:05
 STARTED: 06/22/82 15:05, ON: CE2P BY: 0



CMBDEQ RESULTS FOR CMB # QT10 2

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 10

ALL VALID SAMPLES

SITE: PADBURY

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE 1.587 D OF F: 7
CODE SOURCE FLG UG/M3 %

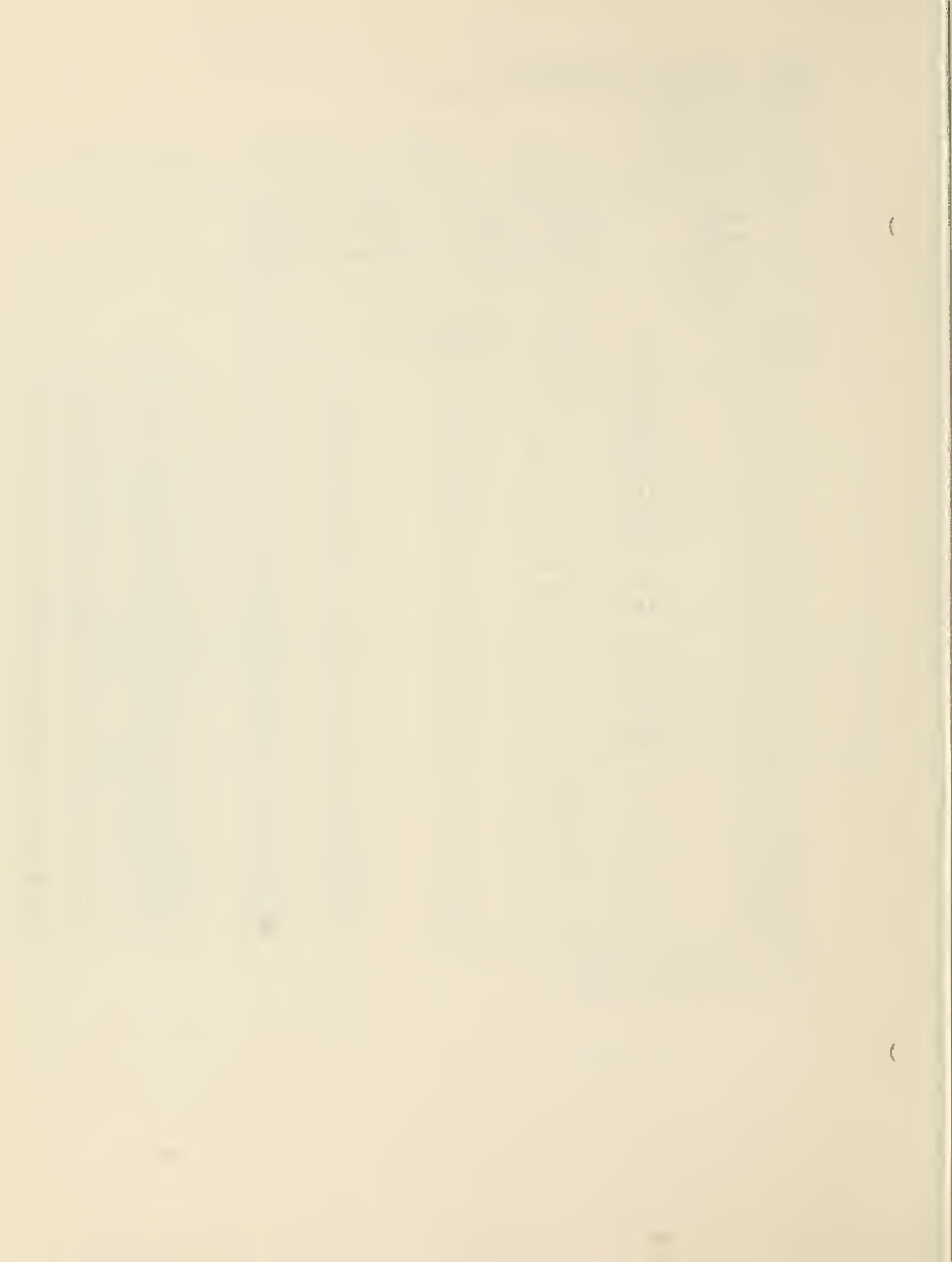
1	TRANS	*	0.025+-	0.022	0.217+-	0.193
10	GEO-H	*	3.877+-	0.858	33.137+-	7.886
11	GEO-I	*	2.315+-	0.774	19.789+-	6.841

TOTAL: 6.217+- 1.156 53.143+-10.918

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO			
1 AL *	0.521+-	0.063	4.452	0.479+-	0.034	0.921+-	0.089	AL
2 SI *	1.780+-	0.236	15.213	1.709+-	0.122	0.960+-	0.095	SI
3 P	0.038+-	0.006	0.323	0.012+-	0.001	0.315+-	0.025	P
4 S	0.389+-	0.059	3.323	0.040+-	0.003	0.102+-	0.009	S
5 CL	0.014+-	0.005	0.121	0.015+-	0.001	1.064+-	0.127	CL
6 K *	0.115+-	0.011	0.986	0.117+-	0.008	1.011+-	0.102	K
7 CA *	0.265+-	0.046	2.266	0.195+-	0.014	0.735+-	0.065	CA
8 TI *	0.020+-	0.003	0.170	0.026+-	0.002	1.331+-	0.159	TI
9 V	0.001+-	0.001	0.012	0.001+-	0.000	1.017+-	0.167	V
10 CR	<	0.001	---	0.001+-	0.000	0.000+-	0.000	CR
11 MN	0.002+-	0.001	0.015	0.004+-	0.000	2.086+-	0.385	MN
12 FE *	0.181+-	0.022	1.549	0.178+-	0.014	0.980+-	0.105	FE
13 NI	<	0.001	---	0.000+-	0.000	0.000+-	0.000	NI
14 CU	0.001+-	0.001	0.003	0.010+-	0.001	9.999+-	9.999	CU
15 ZN *	0.010+-	0.002	0.083	0.009+-	0.001	0.950+-	0.121	ZN
16 AS *	0.005+-	0.002	0.047	0.001+-	0.000	0.162+-	0.058	AS
17 SE	0.000+-	0.000	0.001	0.000+-	0.000	0.284+-	0.156	SE
18 BR *	0.006+-	0.001	0.053	0.006+-	0.001	0.894+-	0.165	BR
19 SR	0.002+-	0.001	0.014	0.002+-	0.000	1.141+-	0.137	SR
20 PD	<	0.001	---	0.000+-	0.000	0.000+-	0.000	PD
21 AG	0.003+-	0.003	0.013	0.000+-	0.000	0.000+-	0.119	AG
22 CD	<	0.001	---	0.002+-	0.001	0.000+-	0.000	CD
23 IN	<	0.001	---	0.000+-	0.001	0.000+-	0.000	IN
24 SH	0.021+-	0.008	0.183	0.000+-	0.001	0.000+-	0.031	SH
25 SB	<	0.001	---	0.000+-	0.001	0.000+-	0.000	SB
26 BA	0.070+-	0.033	0.596	0.007+-	0.003	0.097+-	0.050	BA
27 HG	0.001+-	0.001	0.003	0.000+-	0.000	0.194+-	0.201	HG
28 PB *	0.018+-	0.004	0.156	0.021+-	0.002	1.145+-	0.148	PB

MEAS. AMB. MASS (UG/M3): 11.7

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT10 2
 TOTAL PARTICULATE FRACTION
 SAMPLING DATE: QTR 2 SITE CODE: 10
 ALL VALID SAMPLES
 SITE: PADBURY

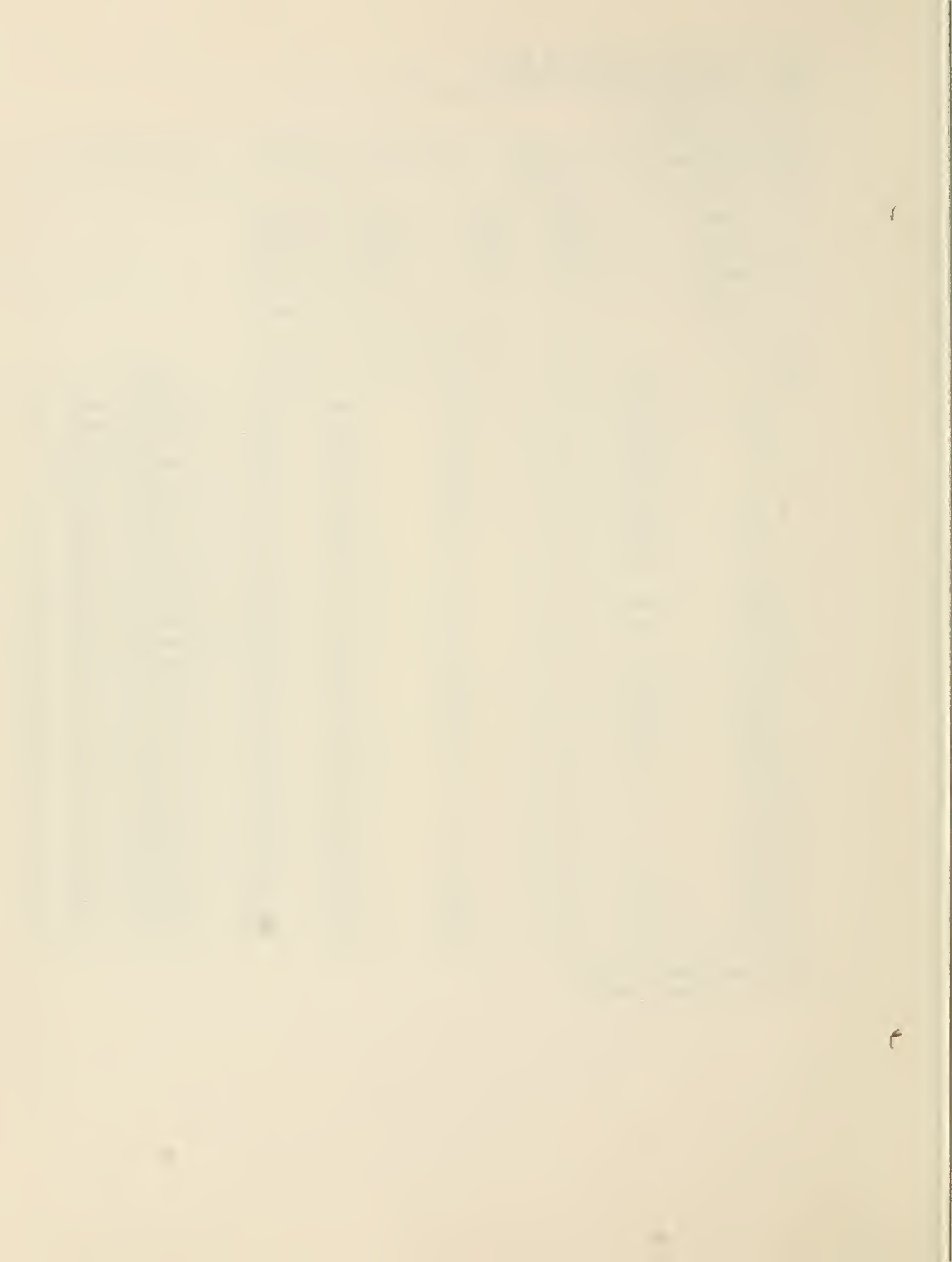
EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.194 D OF F: 6
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.026+-	0.022	0.219+-	0.191
10	GEO-H	*	3.572+-	0.862	30.531+-	7.834
11	GEO-I	*	2.558+-	0.778	21.864+-	6.918
65	DRBLD	*	0.017+-	0.009	0.148+-	0.078

TOTAL: 6.173+- 1.161 52.763+-10.943

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.521+-	0.063	4.452	0.484+-	0.034	0.929+-0.090 AL
2 SI *	1.780+-	0.236	15.213	1.714+-	0.121	0.963+-0.095 SI
3 P	0.038+-	0.006	0.323	0.012+-	0.001	0.308+-0.024 P
4 S	0.389+-	0.059	3.323	0.037+-	0.003	0.096+-0.008 S
5 CL	0.014+-	0.005	0.121	0.014+-	0.001	1.019+-0.116 CL
6 K *	0.115+-	0.011	0.986	0.117+-	0.008	1.014+-0.102 K
7 CA *	0.265+-	0.046	2.266	0.196+-	0.014	0.740+-0.065 CA
8 TI *	0.020+-	0.003	0.170	0.026+-	0.002	1.328+-0.157 TI
9 V	0.001+-	0.001	0.012	0.001+-	0.000	1.007+-0.169 V
10 CR	<	0.001	---	0.001+-	0.000	0.000+-0.000 CR
11 MN	0.002+-	0.001	0.015	0.004+-	0.000	2.013+-0.351 MN
12 FE *	0.181+-	0.022	1.549	0.173+-	0.013	0.956+-0.099 FE
13 NI	<	0.001	---	0.000+-	0.000	0.000+-0.000 NI
14 CU	0.001+-	0.001	0.003	0.010+-	0.001	9.999+-9.999 CU
15 ZN *	0.010+-	0.002	0.083	0.009+-	0.001	0.913+-0.109 ZN
16 AS *	0.005+-	0.002	0.047	0.005+-	0.001	0.907+-0.146 AS
17 SE	0.000+-	0.000	0.001	0.000+-	0.000	0.343+-0.155 SE
18 BR *	0.006+-	0.001	0.053	0.005+-	0.001	0.849+-0.160 BR
19 SR	0.002+-	0.001	0.014	0.002+-	0.000	1.151+-0.136 SR
20 PD	<	0.001	---	0.000+-	0.000	0.000+-0.000 PD
21 AG	0.003+-	0.003	0.013	0.000+-	0.000	0.028+-0.112 AG
22 CD	<	0.001	---	0.002+-	0.001	0.000+-0.000 CD
23 IN	<	0.001	---	0.000+-	0.001	0.000+-0.000 IN
24 SN	0.021+-	0.009	0.183	0.000+-	0.001	0.010+-0.029 SN
25 SB	<	0.001	---	0.001+-	0.001	0.000+-0.000 SB
26 BA	0.070+-	0.033	0.596	0.007+-	0.003	0.106+-0.047 BA
27 HG	0.001+-	0.001	0.003	0.000+-	0.000	0.209+-0.128 HG
28 PB *	0.018+-	0.004	0.156	0.022+-	0.002	1.212+-0.145 PB

MEAS. AMB. MASS (UG/M3): 11 7
 * - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT10 3

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 10

ALL VALID SAMPLES

SITE: PADBURY

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.406 D OF F: 10
CODE SOURCE FLG UG/M3 %

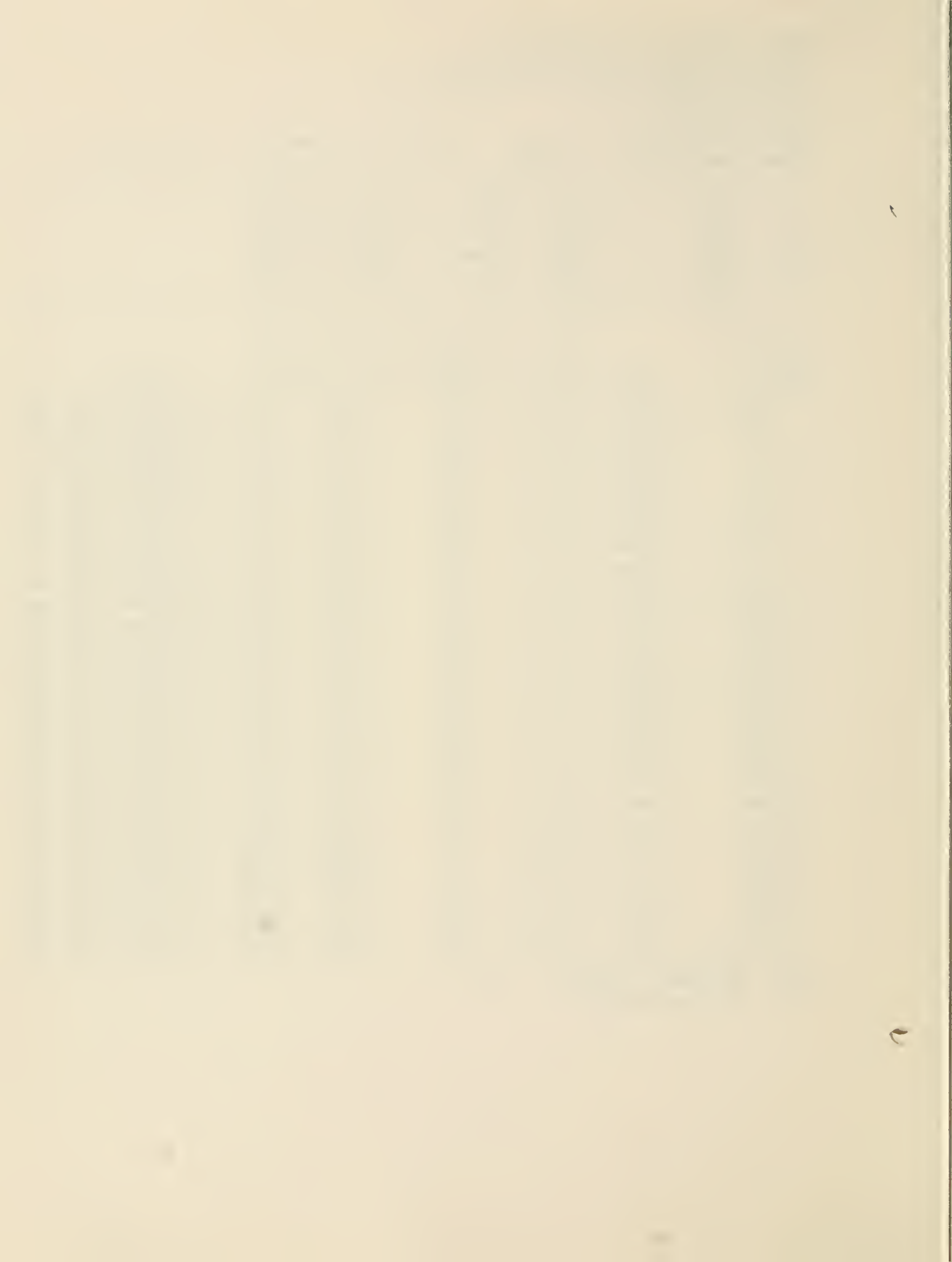
1	TRANS	*	0.245+-	0.095	0.547+-	0.232
3	GEO.A	*	32.814+-	2.334	73.274+-	13.457
26	LIME	*	4.764+-	1.466	10.637+-	3.736
68	MSSTK	*	0.426+-	0.098	0.952+-	0.272
69	ZNSTK	*	0.090+-	0.034	0.201+-	0.084

TOTAL: 38.339+- 2.760 85.611+-15.752

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	3.037+-	0.495	6.781	2.984+-	0.293	0.983+-0.135 AL
2 SI *	11.343+-	1.873	25.328	11.212+-	1.106	0.988+-0.137 SI
3 P	0.106+-	0.013	0.236	0.057+-	0.006	0.538+-0.059 P
4 S	0.660+-	0.083	1.474	0.174+-	0.010	0.264+-0.016 S
5 CL	0.061+-	0.013	0.136	0.060+-	0.004	0.985+-0.094 CL
6 K *	0.686+-	0.109	1.533	0.617+-	0.061	0.899+-0.119 K
7 CA *	2.027+-	0.385	4.527	2.031+-	0.151	1.002+-0.106 CA
8 TI *	0.145+-	0.023	0.325	0.153+-	0.015	1.049+-0.149 TI
9 V *	0.006+-	0.001	0.013	0.007+-	0.001	1.304+-0.209 V
10 CR *	0.009+-	0.002	0.019	0.008+-	0.001	0.872+-0.110 CR
11 MN *	0.030+-	0.004	0.066	0.028+-	0.002	0.937+-0.115 MN
12 FE *	1.171+-	0.177	2.614	1.317+-	0.127	1.125+-0.163 FE
13 NI	0.001+-	0.000	0.002	0.003+-	0.000	2.747+-0.978 NI
14 CU *	0.026+-	0.006	0.057	0.020+-	0.001	0.783+-0.071 CU
15 ZN *	0.086+-	0.017	0.192	0.086+-	0.006	0.995+-0.091 ZN
16 AS *	0.024+-	0.006	0.054	0.023+-	0.002	0.947+-0.117 AS
17 SE	0.001+-	0.000	0.001	0.001+-	0.000	1.412+-0.175 SE
18 BR *	0.019+-	0.002	0.042	0.017+-	0.006	0.900+-0.451 BR
19 SR	0.009+-	0.001	0.020	0.007+-	0.001	0.810+-0.079 SR
20 PD	0.001+-	0.001	0.002	0.000+-	0.001	0.335+-0.504 PD
21 AG	0.001+-	0.001	0.002	0.001+-	0.001	0.873+-0.956 AG
22 CD *	0.012+-	0.006	0.027	0.009+-	0.001	0.710+-0.144 CD
23 IN	0.004+-	0.004	0.004	0.000+-	0.001	0.029+-0.359 IN
24 SN	0.003+-	0.003	0.004	0.002+-	0.002	0.478+-0.579 SN
25 SB	<	0.001	---	0.010+-	0.003	0.000+-0.000 SB
26 BA	0.095+-	0.034	0.212	0.007+-	0.008	0.070+-0.088 BA
27 HG	0.000+-	0.000	0.000	0.001+-	0.000	2.964+-2.676 HG
28 PB *	0.163+-	0.029	0.364	0.182+-	0.014	1.119+-0.128 PB

MEAS. AMB. MASS (UG/M3): 44.8

* - FITTING ELEMENT



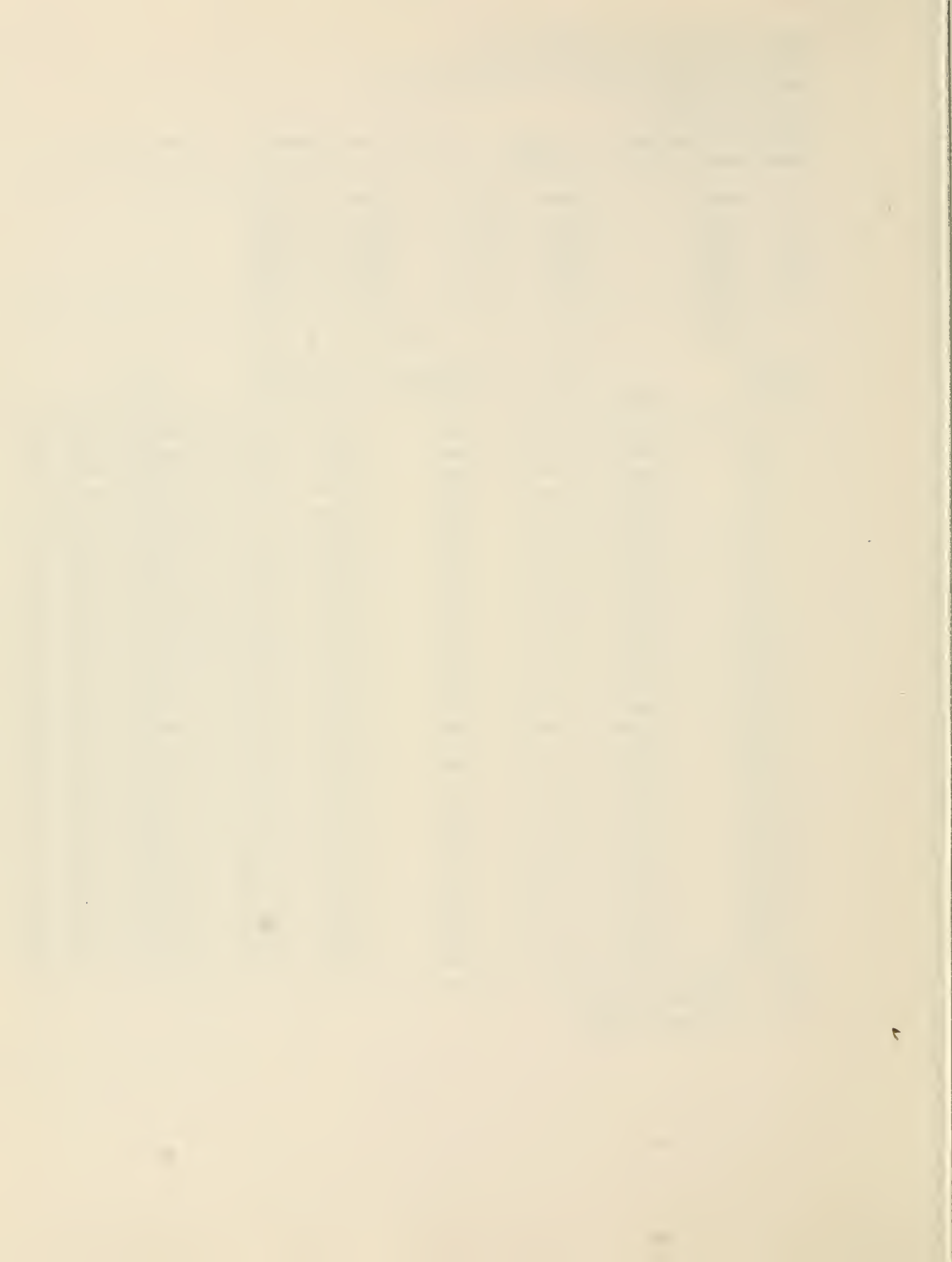
CMODEQ RESULTS FOR CMB # QT10 4
 TOTAL PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 10
 ALL VALID SAMPLES
 SITE: PADBURY

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.346 D OF F: 7
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.266+-	0.132	1.188+-	0.610	
10	GEO-H	*	11.178+-	0.917	49.822+-	7.826	
26	LIME	*	0.822+-	0.394	3.663+-	1.824	
68	MSSTK	*	0.365+-	0.107	1.625+-	0.523	
69	ZHSTK	*	0.076+-	0.033	0.338+-	0.154	
70	BGSTK	*	0.030+-	0.023	0.133+-	0.102	
TOTAL:			12.736+-	1.013	56.768+-	8.845	

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC UG/M3	RATIO	
1 AL *	0.823+-	0.136	3.666	0.733+-	0.072	0.891+-0.117 AL
2 SI *	2.881+-	0.475	12.841	2.784+-	0.275	0.966+-0.133 SI
3 P	0.060+-	0.008	0.267	0.027+-	0.002	0.455+-0.045 P
4 S	0.576+-	0.090	2.567	0.170+-	0.011	0.285+-0.021 S
5 CL	0.046+-	0.011	0.207	0.047+-	0.004	1.001+-0.114 CL
6 K *	0.232+-	0.039	1.036	0.192+-	0.019	0.827+-0.104 K
7 CA *	0.557+-	0.102	2.481	0.556+-	0.039	0.998+-0.098 CA
8 TI *	0.040+-	0.006	0.180	0.046+-	0.004	1.136+-0.168 TI
9 V	0.003+-	0.001	0.013	0.003+-	0.000	0.905+-0.156 V
10 CR	0.002+-	0.000	0.009	0.003+-	0.000	1.277+-0.191 CR
11 MH *	0.010+-	0.002	0.043	0.010+-	0.001	1.060+-0.131 MH
12 FE *	0.383+-	0.061	1.709	0.392+-	0.036	1.022+-0.136 FE
13 NI	0.001+-	0.000	0.004	0.001+-	0.000	1.763+-0.576 NI
14 CU *	0.031+-	0.006	0.139	0.033+-	0.003	1.072+-0.130 CU
15 ZN *	0.088+-	0.016	0.391	0.088+-	0.005	1.003+-0.083 ZN
16 AS *	0.024+-	0.005	0.106	0.021+-	0.002	0.884+-0.105 AS
17 SE	0.001+-	0.000	0.003	0.001+-	0.000	0.942+-0.275 SE
18 BR *	0.031+-	0.007	0.140	0.029+-	0.007	0.918+-0.303 BR
19 SR	0.004+-	0.001	0.016	0.004+-	0.000	1.015+-0.133 SR
20 PD	0.002+-	0.001	0.011	0.000+-	0.001	0.115+-0.272 PD
21 AG	0.001+-	0.001	0.006	0.001+-	0.001	0.765+-0.985 AG
22 CD *	0.016+-	0.004	0.073	0.016+-	0.002	1.000+-0.153 CD
23 IH	0.001+-	0.001	0.007	0.000+-	0.002	0.140+-1.129 IH
24 SH	0.003+-	0.002	0.012	0.001+-	0.002	0.537+-0.758 SH
25 SB	0.015+-	0.005	0.066	0.007+-	0.004	0.485+-0.273 SB
26 BA	0.011+-	0.008	0.049	0.002+-	0.009	0.192+-0.866 BA
27 HG	0.002+-	0.000	0.007	0.001+-	0.000	0.631+-0.254 HG
28 PB *	0.190+-	0.035	0.848	0.203+-	0.014	1.069+-0.105 PB

MEAS. AMB. MASS (UG/M3): 22 4
 * - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT104C

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 10

CO-COLLECTED SAMPLES

SITE: PADBURY

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.308 D OF F: 7

CODE SOURCE FLG UG/M3 %

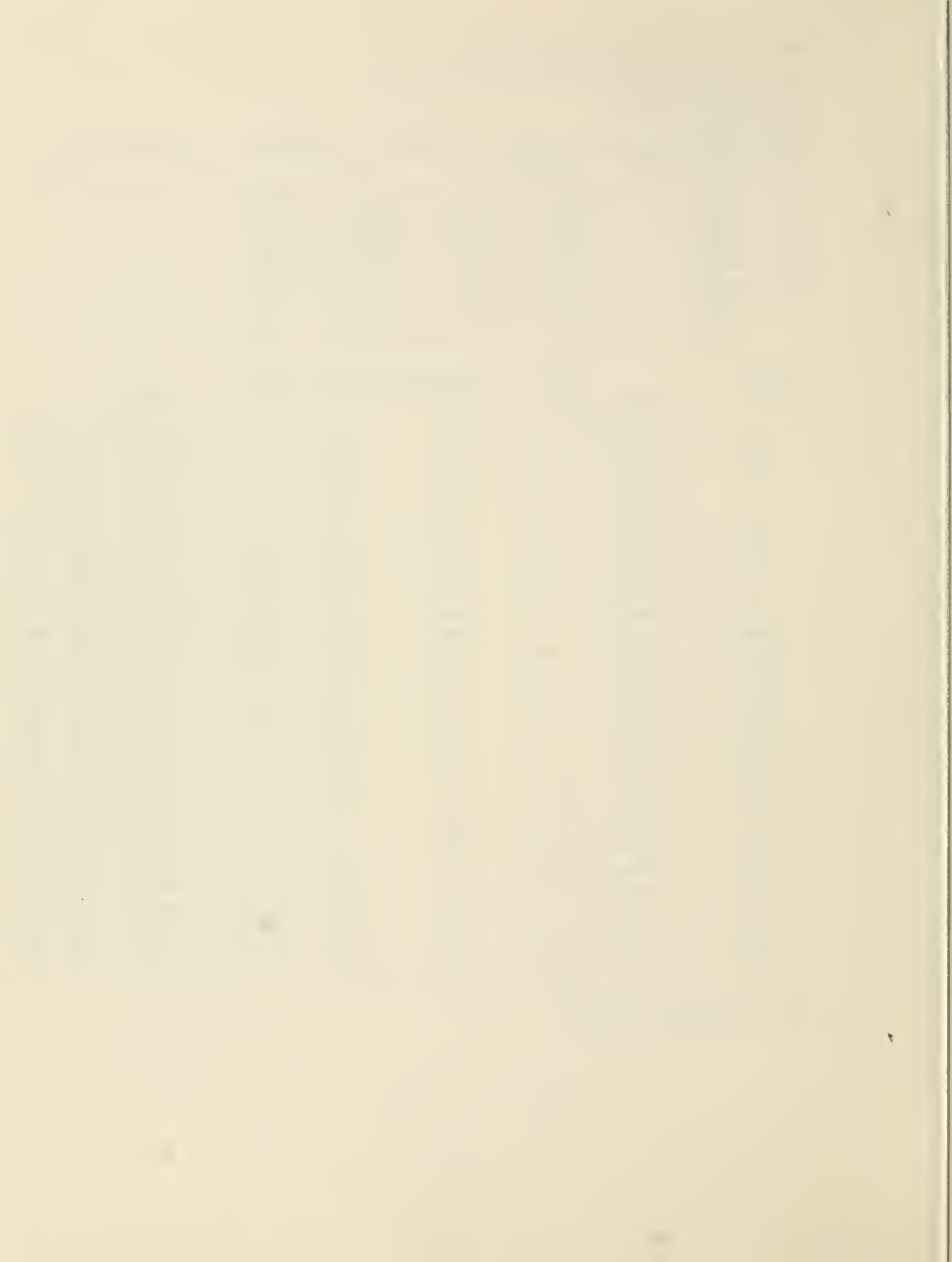
1	TRANS	*	0.286+-	0.141	1.259+-	0.645
10	GEO-H	*	11.020+-	0.966	48.461+-	8.104
26	LIME	*	0.798+-	0.420	3.509+-	1.915
68	MSSTK	*	0.389+-	0.114	1.712+-	0.557
69	ZNSTK	*	0.082+-	0.035	0.363+-	0.162
70	BGSTK	*	0.035+-	0.024	0.152+-	0.107

TOTAL: 12.610+- 1.070 55.455+- 9.192

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO			
1 AL *	0.811+-	0.147	3.568	0.723+-	0.071	0.891+-	0.117	AL
2 SI *	2.842+-	0.511	12.498	2.746+-	0.271	0.966+-	0.132	SI
3 P	0.061+-	0.009	0.268	0.027+-	0.002	0.445+-	0.043	P
4 S	0.596+-	0.097	2.622	0.173+-	0.011	0.290+-	0.020	S
5 CL	0.049+-	0.012	0.218	0.047+-	0.004	0.944+-	0.104	CL
6 K *	0.229+-	0.042	1.007	0.190+-	0.018	0.830+-	0.104	K
7 CA *	0.547+-	0.110	2.406	0.546+-	0.038	0.997+-	0.098	CA
8 TI *	0.039+-	0.006	0.172	0.045+-	0.004	1.155+-	0.172	TI
9 V	0.003+-	0.001	0.013	0.003+-	0.000	0.892+-	0.153	V
10 CR	0.002+-	0.000	0.009	0.003+-	0.000	1.330+-	0.203	CR
11 MN *	0.010+-	0.002	0.043	0.010+-	0.001	1.060+-	0.130	MN
12 FE *	0.376+-	0.066	1.652	0.388+-	0.036	1.034+-	0.138	FE
13 NI	0.001+-	0.000	0.004	0.001+-	0.000	1.604+-	0.472	NI
14 CU *	0.033+-	0.007	0.146	0.034+-	0.003	1.010+-	0.117	CU
15 ZN *	0.093+-	0.017	0.409	0.093+-	0.005	1.002+-	0.083	ZN
16 AS *	0.025+-	0.006	0.109	0.022+-	0.002	0.898+-	0.106	AS
17 SE	0.001+-	0.000	0.003	0.001+-	0.000	0.992+-	0.281	SE
18 BR *	0.033+-	0.007	0.144	0.030+-	0.008	0.914+-	0.311	BR
19 SR	0.003+-	0.001	0.015	0.004+-	0.000	1.076+-	0.143	SR
20 PD	0.002+-	0.001	0.010	0.000+-	0.001	0.135+-	0.292	PD
21 AG	0.001+-	0.001	0.006	0.001+-	0.001	0.761+-	0.901	AG
22 CD *	0.018+-	0.005	0.078	0.018+-	0.002	0.998+-	0.144	CD
23 IN	0.002+-	0.001	0.007	0.000+-	0.002	0.135+-	1.043	IN
24 SN	0.002+-	0.001	0.007	0.002+-	0.002	0.983+-	1.559	SN
25 SB	0.016+-	0.006	0.070	0.008+-	0.004	0.480+-	0.250	SB
26 BA	0.012+-	0.009	0.053	0.002+-	0.009	0.181+-	0.789	BA
27 HG	0.002+-	0.000	0.007	0.001+-	0.000	0.618+-	0.235	HG
28 PB *	0.200+-	0.037	0.880	0.215+-	0.015	1.073+-	0.106	PB

MEAS. AMB. MASS (UG/M3): 22.7

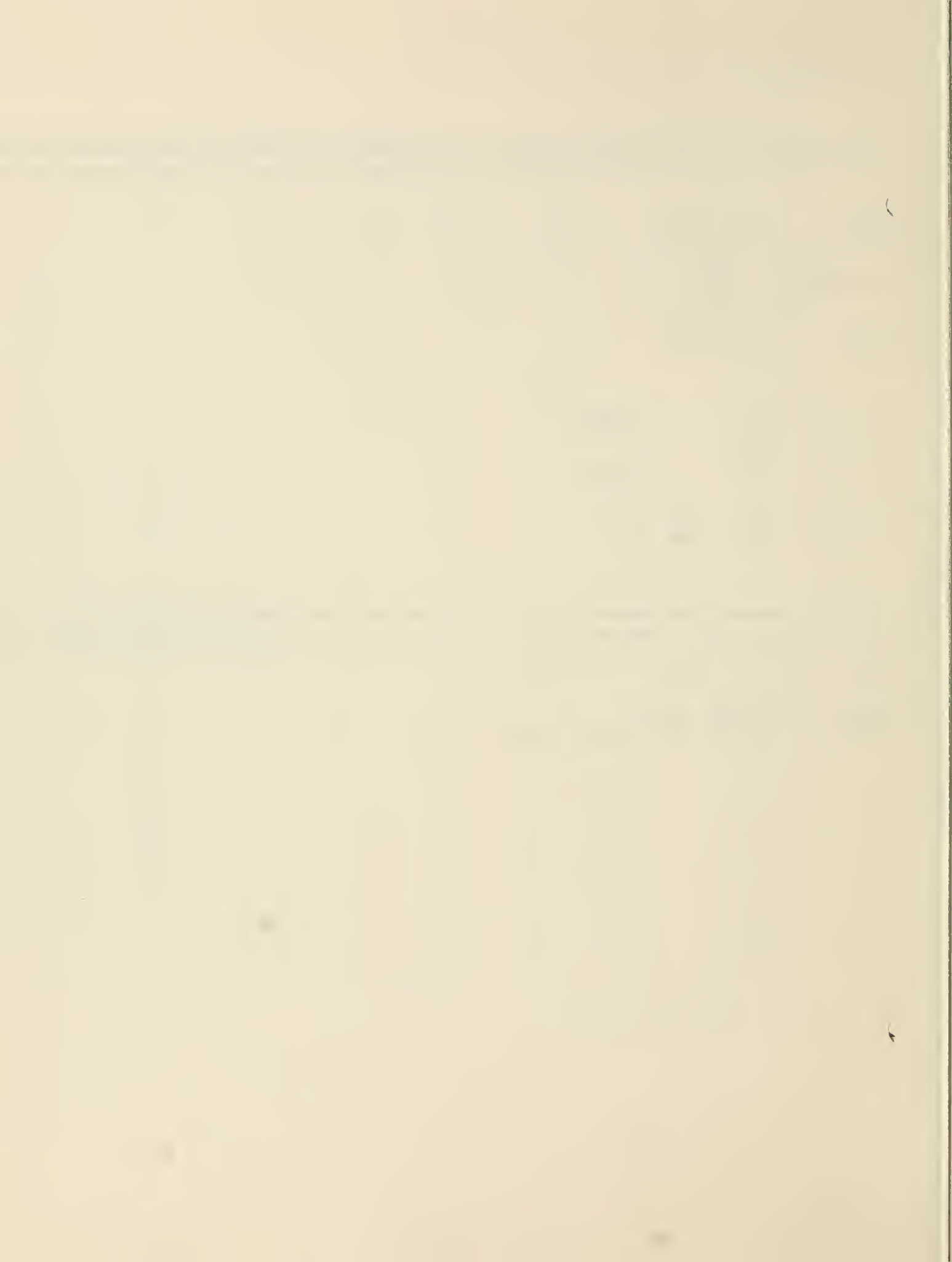
* - FITTING ELEMENT



11.

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SPooled: 06/22/82 15:07
STARTED: 06/22/82 15:14, ON: CE2P BY: Q



CMODED RESULTS FOR CMB # QF11 4

FINE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 11

ALL VALID SAMPLES

SITE: SOUTH

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.207 D OF F: 4

CODE SOURCE FLG UG/M3 %

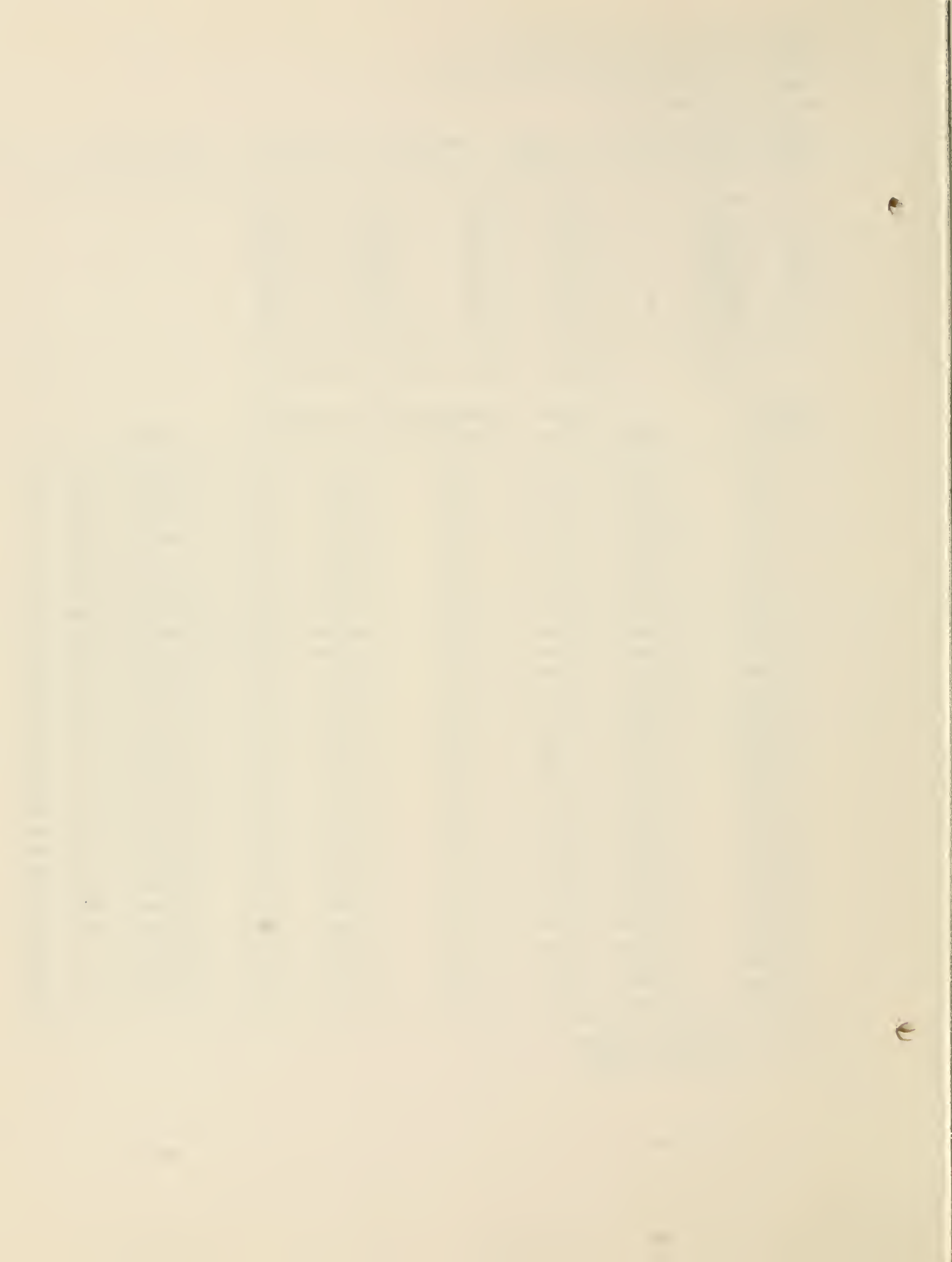
1	TRANS	*	0.219+-	0.092	1.941+-	0.954
20	GEO-R	*	0.631+-	0.076	5.581+-	1.334
64	ZNBLO	*	0.546+-	0.175	4.833+-	1.845
65	DRBLO	*	0.100+-	0.038	0.886+-	0.380
67	BLFUP	*	0.457+-	0.109	4.042+-	1.278
74	CUKST	*	0.075+-	0.028	0.663+-	0.285
77	SEC30	*	2.163+-	0.554	19.140+-	6.302
79	WSTOV	*	18.698+-	4.225	165.481+-	50.666

TOTAL: 22.888+- 4.269 202.567+-56.376

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALCD. UG/M3	RATIO		
1 AL *	0.073+-	0.010	0.649	0.064+-	0.005	0.875+-0.087	AL
2 SI *	0.155+-	0.022	1.369	0.162+-	0.014	1.049+-0.129	SI
3 P	0.041+-	0.006	0.361	0.015+-	0.001	0.362+-0.020	P
4 S *	0.677+-	0.122	5.994	0.677+-	0.054	1.000+-0.112	S
5 CL	0.026+-	0.005	0.231	0.042+-	0.005	1.617+-0.367	CL
6 K *	0.091+-	0.012	0.802	0.092+-	0.004	1.017+-0.070	K
7 CA *	0.104+-	0.028	0.919	0.110+-	0.010	1.055+-0.140	CA
8 TI	0.001+-	0.000	0.012	0.002+-	0.000	1.724+-0.368	TI
9 V	0.000+-	0.000	0.003	0.000+-	0.000	0.480+-0.700	V
10 CR	0.000+-	0.000	0.003	0.000+-	0.000	0.906+-0.852	CR
11 MN	0.001+-	0.000	0.010	0.001+-	0.000	0.867+-0.275	MN
12 FE *	0.024+-	0.003	0.211	0.024+-	0.002	1.028+-0.125	FE
13 NI	0.001+-	0.000	0.008	0.001+-	0.000	1.114+-0.324	NI
14 CU *	0.044+-	0.015	0.393	0.044+-	0.004	1.001+-0.130	CU
15 ZN *	0.172+-	0.036	1.521	0.173+-	0.013	1.008+-0.107	ZN
16 AS *	0.080+-	0.020	0.712	0.080+-	0.006	0.999+-0.106	AS
17 SE	0.001+-	0.000	0.012	0.001+-	0.000	0.622+-0.177	SE
18 BR *	0.016+-	0.003	0.140	0.016+-	0.006	0.987+-0.507	BR
19 SR	0.000+-	0.000	0.003	0.000+-	0.000	1.542+-1.199	SR
20 PD	0.002+-	0.001	0.019	0.006+-	0.001	2.681+-0.689	PD
21 AG	0.001+-	0.001	0.012	0.002+-	0.001	1.626+-1.122	AG
22 CO *	0.020+-	0.019	0.709	0.072+-	0.008	0.977+-0.132	CO
23 IN	0.001+-	0.001	0.011	0.000+-	0.001	0.165+-0.958	IN
24 SH	0.004+-	0.002	0.032	0.006+-	0.001	1.536+-0.697	SH
25 SB	0.015+-	0.006	0.133	0.008+-	0.002	0.551+-0.177	SB
26 BA	0.003+-	0.003	0.014	0.001+-	0.006	0.329+-1.991	BA
27 HG	0.001+-	0.000	0.007	0.001+-	0.000	1.529+-0.481	HG
28 PB *	0.308+-	0.078	2.729	0.314+-	0.022	1.017+-0.102	PB

MEAS. AMB. MASS (UG/M3): 11.3

* - FITTING ELEMENT



CMRDED RESULTS FOR CMB # GF11 4
 FINE PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 11
 ALL VALID SAMPLES
 SITE: SOUTH

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 4 144 D OF F: 5
 CODE SOURCE FLG UG/M3 %

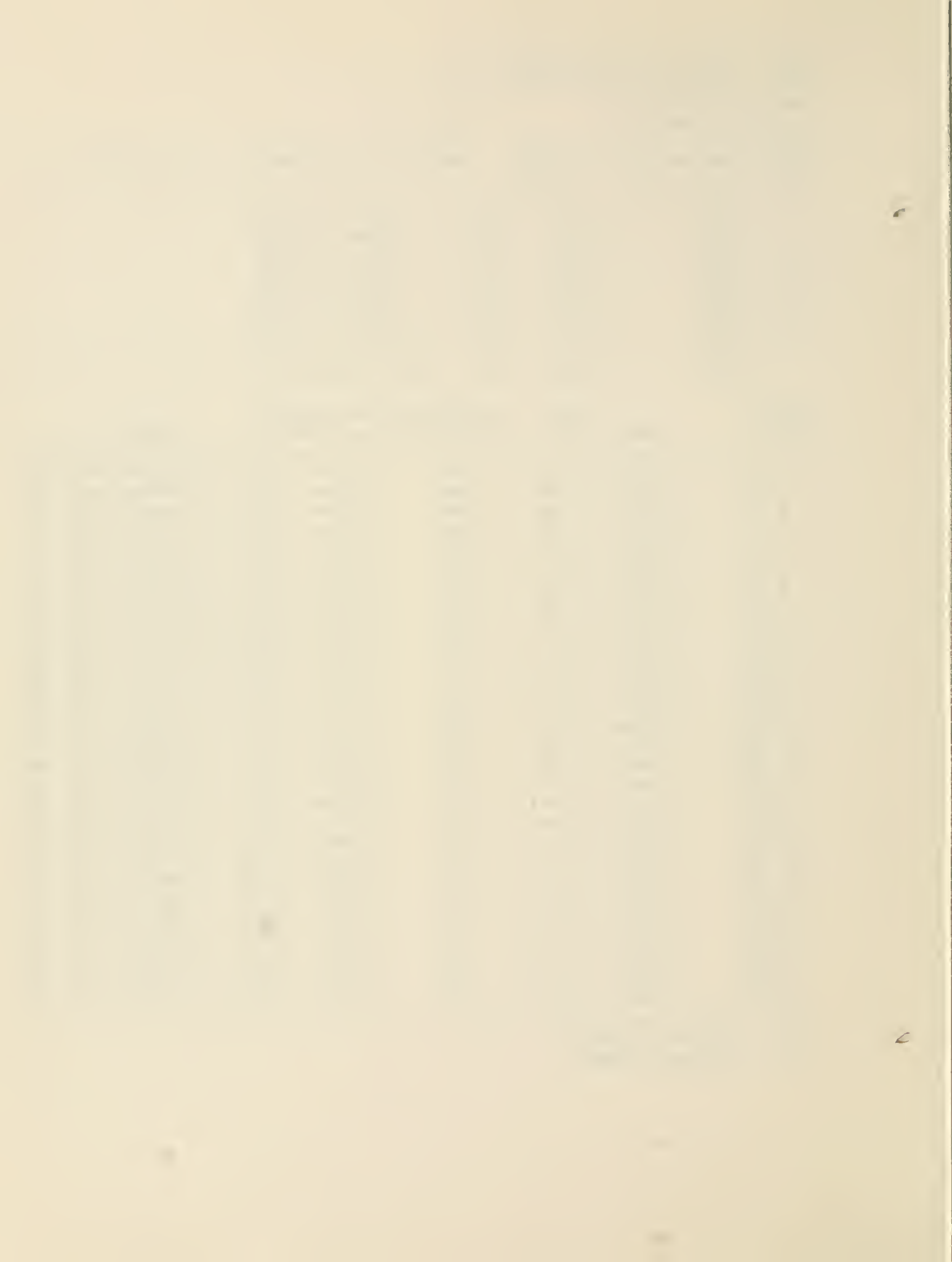
1	TRANS	*	0.217+-	0.097	1.921+-	0.947
20	GEO-R	*	0.666+-	0.077	5.898+-	1.394
64	ZHBLD	*	0.719+-	0.177	6.362+-	2.046
65	DRBLD	*	0.095+-	0.038	0.841+-	0.375
67	BLFUP	*	0.507+-	0.110	4.486+-	1.345
74	DUKST	*	0.074+-	0.028	0.656+-	0.284
77	SECSO	*	2.208+-	0.557	19.539+-	6.369

TOTAL: 4.486+- 0.609 39.703+- 9.814

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.073+-	0.010	0.649	0.060+-	0.005	0.823+-0.088 AL
2 SI *	0.155+-	0.022	1.369	0.170+-	0.015	1.098+-0.140 SI
3 P	0.041+-	0.006	0.361	0.009+-	0.001	0.226+-0.014 P
4 S *	0.677+-	0.122	5.994	0.677+-	0.055	1.000+-0.114 S
5 CL	0.026+-	0.005	0.231	0.037+-	0.006	1.429+-0.373 CL
6 K *	0.091+-	0.012	0.802	0.037+-	0.004	0.409+-0.047 K
7 CA *	0.104+-	0.028	0.919	0.111+-	0.011	1.074+-0.150 CA
8 TI	0.001+-	0.000	0.012	0.002+-	0.000	1.730+-0.270 TI
9 V	0.000+-	0.000	0.003	0.000+-	0.000	0.534+-0.116 V
10 CR	0.000+-	0.000	0.003	0.000+-	0.000	1.017+-0.153 CR
11 MH	0.001+-	0.000	0.010	0.001+-	0.000	0.913+-0.166 MH
12 FE *	0.024+-	0.003	0.211	0.026+-	0.002	1.113+-0.138 FE
13 NI	0.001+-	0.000	0.008	0.001+-	0.000	1.243+-0.109 NI
14 CU *	0.044+-	0.015	0.393	0.045+-	0.004	1.006+-0.129 CU
15 ZH *	0.172+-	0.036	1.521	0.211+-	0.017	1.229+-0.155 ZH
16 AS *	0.080+-	0.020	0.712	0.080+-	0.006	0.990+-0.101 AS
17 SE	0.001+-	0.000	0.012	0.001+-	0.000	0.538+-0.054 SE
18 BR *	0.016+-	0.003	0.140	0.015+-	0.006	0.947+-0.492 BR
19 SR	0.000+-	0.000	0.003	0.001+-	0.000	1.738+-0.422 SR
20 PD	0.002+-	0.001	0.019	0.006+-	0.000	2.972+-0.558 PD
21 AG	0.001+-	0.001	0.012	0.002+-	0.000	1.778+-0.261 AG
22 CD *	0.080+-	0.019	0.709	0.087+-	0.008	1.085+-0.154 CD
23 IN	0.001+-	0.001	0.011	0.000+-	0.000	0.187+-0.149 IN
24 SN	0.004+-	0.002	0.032	0.007+-	0.000	1.836+-0.277 SN
25 SB	0.015+-	0.006	0.133	0.009+-	0.001	0.579+-0.082 SB
26 BA	0.003+-	0.003	0.014	0.001+-	0.001	0.380+-0.325 BA
27 HG	0.001+-	0.000	0.007	0.001+-	0.000	1.419+-0.232 HG
28 PS *	0.308+-	0.078	2.729	0.353+-	0.024	1.145+-0.121 PS

MEAS AMB. MASS (UG/M3): 11.3

* - FITTING ELEMENT



CMODED RESULTS FOR CMB # QF1140
 FINE PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 11
 CO-COLLECTED SAMPLES
 SITE: SOUTH

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.225 D OF F: 4
 CODE SOURCE FLG UG/M3 %

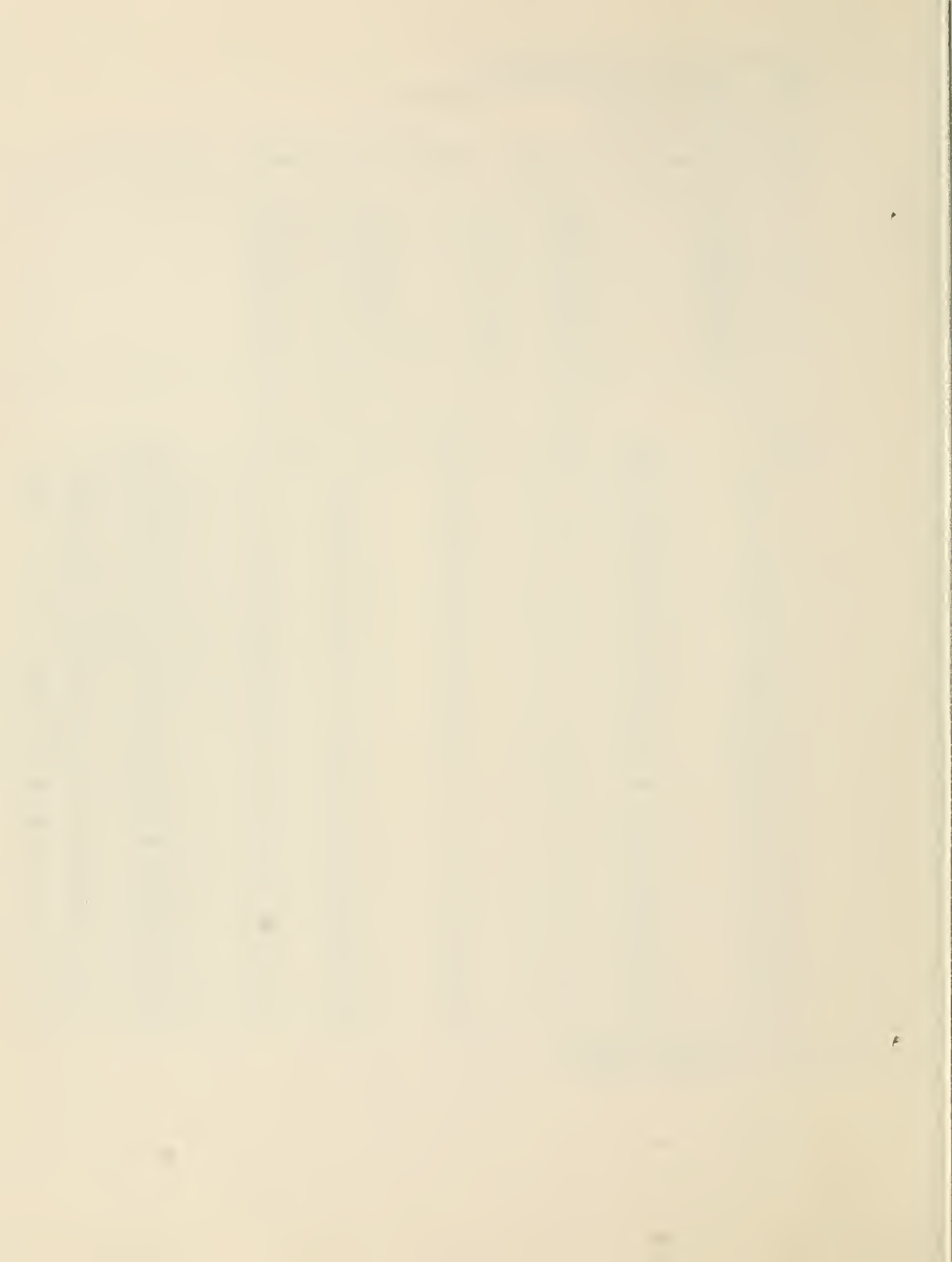
1	TRANS	*	0.225+- 0.101	1.980+- 0.980
20	GEO-R	*	0.627+- 0.078	5.519+- 1.361
64	ZNBLO	*	0.540+- 0.180	4.753+- 1.881
65	DRBLO	*	0.101+- 0.039	0.886+- 0.390
67	BLFUP	*	0.458+- 0.113	4.029+- 1.311
74	CUKST	*	0.077+- 0.029	0.679+- 0.294
77	SECSO	*	2.180+- 0.572	19.175+- 6.475
79	WSTOV	*	18.247+- 4.313	160.519+- 51.043

TOTAL: 22.455+- 4.358 197.539+- 56.880

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	0.074+- 0.011	0.648	0.064+- 0.005	0.863+- 0.085	AL
2 SI *	0.154+- 0.022	1.358	0.161+- 0.014	1.045+- 0.128	SI
3 P	0.041+- 0.007	0.359	0.015+- 0.001	0.358+- 0.020	P
4 S *	0.681+- 0.126	5.991	0.681+- 0.054	1.000+- 0.112	S
5 CL	0.026+- 0.006	0.230	0.042+- 0.005	1.604+- 0.364	CL
6 K *	0.089+- 0.013	0.781	0.091+- 0.004	1.020+- 0.070	K
7 CA *	0.103+- 0.029	0.908	0.109+- 0.010	1.057+- 0.140	CA
8 TI	0.001+- 0.000	0.012	0.002+- 0.000	1.713+- 0.360	TI
9 V	0.000+- 0.000	0.003	0.000+- 0.000	0.477+- 0.683	V
10 CR	0.000+- 0.000	0.003	0.000+- 0.000	0.904+- 0.831	CR
11 MN	0.001+- 0.000	0.010	0.001+- 0.000	0.870+- 0.273	MN
12 FE *	0.024+- 0.003	0.208	0.024+- 0.002	1.033+- 0.126	FE
13 NI	0.001+- 0.000	0.008	0.001+- 0.000	1.122+- 0.318	NI
14 CU *	0.046+- 0.015	0.401	0.046+- 0.004	1.001+- 0.130	CU
15 ZN *	0.170+- 0.038	1.496	0.172+- 0.013	1.010+- 0.107	ZN
16 AS *	0.081+- 0.021	0.711	0.081+- 0.006	0.999+- 0.106	AS
17 SE	0.001+- 0.000	0.011	0.001+- 0.000	0.619+- 0.173	SE
18 BR *	0.016+- 0.003	0.141	0.016+- 0.006	0.997+- 0.517	BR
19 SR	0.000+- 0.000	0.002	0.000+- 0.000	2.306+- 2.405	SR
20 PD	0.002+- 0.001	0.019	0.006+- 0.000	2.559+- 0.623	PD
21 AG	0.001+- 0.001	0.011	0.002+- 0.001	1.627+- 1.096	AG
22 CD *	0.080+- 0.020	0.703	0.078+- 0.008	0.982+- 0.133	CD
23 IN	0.001+- 0.001	0.011	0.000+- 0.001	0.165+- 0.935	IN
24 SN	0.003+- 0.002	0.027	0.006+- 0.001	1.778+- 0.881	SN
25 SB	0.014+- 0.006	0.128	0.008+- 0.002	0.571+- 0.182	SB
26 BA	0.003+- 0.003	0.015	0.001+- 0.006	0.318+- 1.879	BA
27 HG	0.001+- 0.000	0.008	0.001+- 0.000	1.355+- 0.387	HG
28 PB *	0.313+- 0.081	2.749	0.315+- 0.022	1.007+- 0.100	PB

MEAS. AMB. MASS (UG/M3): 11.4

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QF1140
 FINE PARTICULATE FRACTION
 SAMPLING DATE: QTR 4 SITE CODE: 11
 CO-COLLECTED SAMPLES
 SITE: SOUTH

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 3.785 D OF F: 5
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.221+-	0.099	1.945+-	0.966
20	GEO-R	*	0.665+-	0.079	5.854+-	1.426
64	ZHBLD	*	0.709+-	0.182	6.238+-	2.079
65	DRBLD	*	0.096+-	0.039	0.842+-	0.385
67	BLFUP	*	0.508+-	0.114	4.470+-	1.379
74	CUKST	*	0.076+-	0.029	0.672+-	0.293
77	SECSO	*	2.223+-	0.574	19.553+-	6.539

TOTAL: 4.498+- 0.627 39.573+-10.065

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.074+-	0.011	0.648	0.060+-	0.005	0.816+-0.087 AL
2 SI *	0.154+-	0.022	1.358	0.169+-	0.015	1.097+-0.140 SI
3 P	0.041+-	0.007	0.359	0.009+-	0.001	0.225+-0.014 P
4 S *	0.681+-	0.126	5.991	0.681+-	0.055	1.000+-0.115 S
5 CL	0.026+-	0.006	0.230	0.037+-	0.006	1.423+-0.371 CL
6 K *	0.089+-	0.013	0.781	0.037+-	0.004	0.416+-0.047 K
7 CA *	0.103+-	0.029	0.908	0.111+-	0.011	1.080+-0.151 CA
8 TI	0.001+-	0.000	0.012	0.002+-	0.000	1.726+-0.269 TI
9 Y	0.000+-	0.000	0.003	0.000+-	0.000	0.532+-0.116 Y
10 CR	0.000+-	0.000	0.003	0.000+-	0.000	1.015+-0.153 CR
11 MH	0.001+-	0.000	0.010	0.001+-	0.000	0.916+-0.168 MH
12 FE *	0.024+-	0.003	0.208	0.026+-	0.002	1.120+-0.139 FE
13 NI	0.001+-	0.000	0.008	0.001+-	0.000	1.247+-0.109 NI
14 CU *	0.046+-	0.015	0.401	0.046+-	0.004	1.006+-0.129 CU
15 ZN *	0.170+-	0.038	1.496	0.209+-	0.017	1.229+-0.155 ZN
16 AS *	0.081+-	0.021	0.711	0.080+-	0.006	0.990+-0.101 AS
17 SE	0.001+-	0.000	0.011	0.001+-	0.000	0.537+-0.054 SE
18 BR *	0.016+-	0.003	0.141	0.015+-	0.006	0.951+-0.496 BR
19 SR	0.000+-	0.000	0.002	0.001+-	0.000	2.601+-0.881 SR
20 PD	0.002+-	0.001	0.019	0.006+-	0.000	2.831+-0.508 PD
21 AG	0.001+-	0.001	0.011	0.002+-	0.000	1.777+-0.260 AG
22 CD *	0.080+-	0.020	0.703	0.087+-	0.008	1.090+-0.155 CD
23 IN	0.001+-	0.001	0.011	0.000+-	0.000	0.187+-0.149 IN
24 SH	0.003+-	0.002	0.027	0.007+-	0.000	2.121+-0.359 SH
25 SB	0.014+-	0.006	0.128	0.009+-	0.001	0.599+-0.086 SB
26 BA	0.003+-	0.003	0.015	0.001+-	0.001	0.368+-0.314 BA
27 HG	0.001+-	0.000	0.008	0.001+-	0.000	1.261+-0.191 HG
28 PB *	0.313+-	0.081	2.749	0.353+-	0.025	1.131+-0.119 PB

MEAS. AMB. MASS (UG/M3): 11.4

* - FITTING ELEMENT

1. 1875

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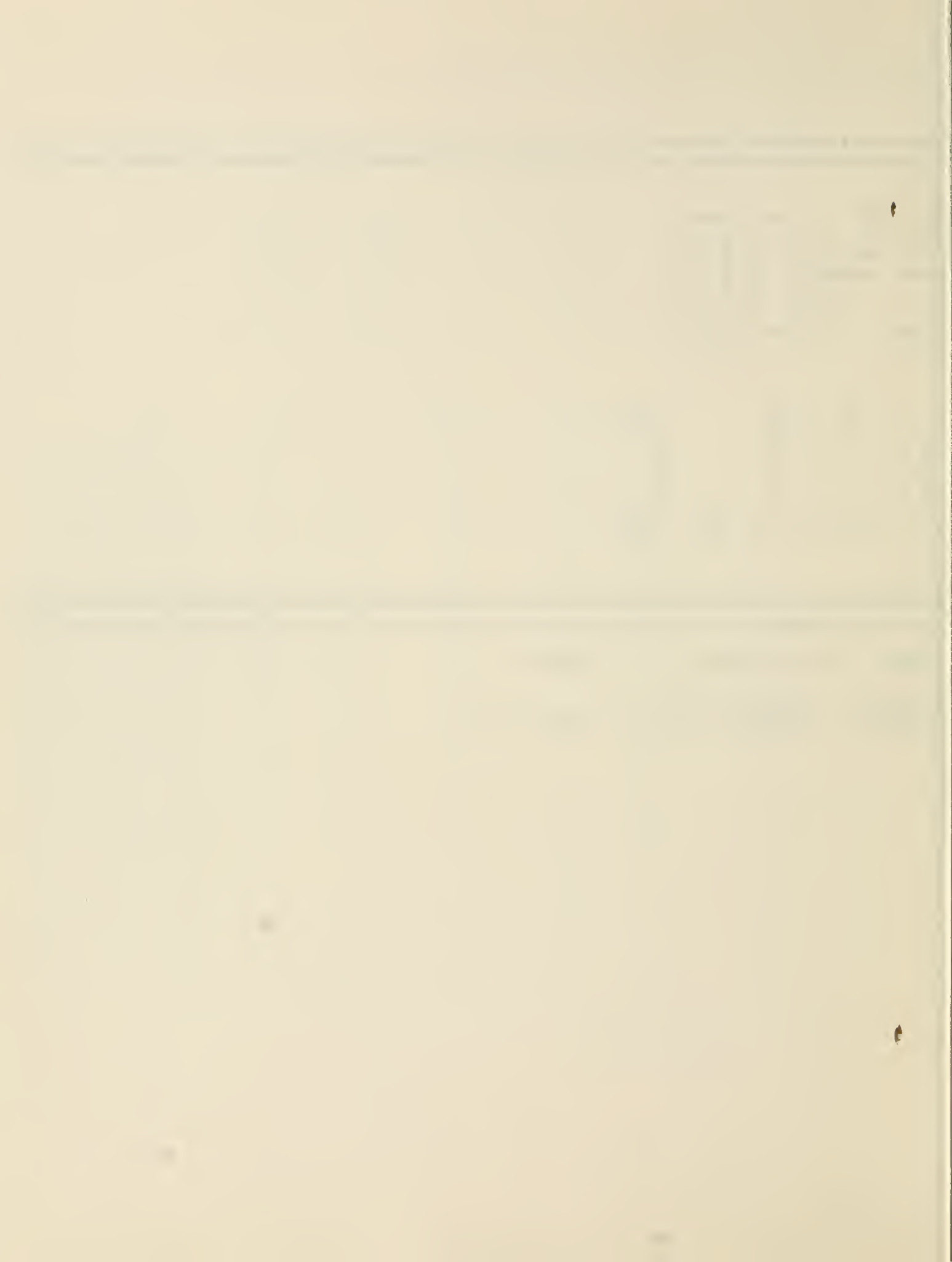
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CMBDEQ RESULTS FOR CMB # QC11.4

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 11

ALL VALID SAMPLES

SITE: SOUTH

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.816 D OF F: 6
CODE SOURCE FLG UG/M3 %

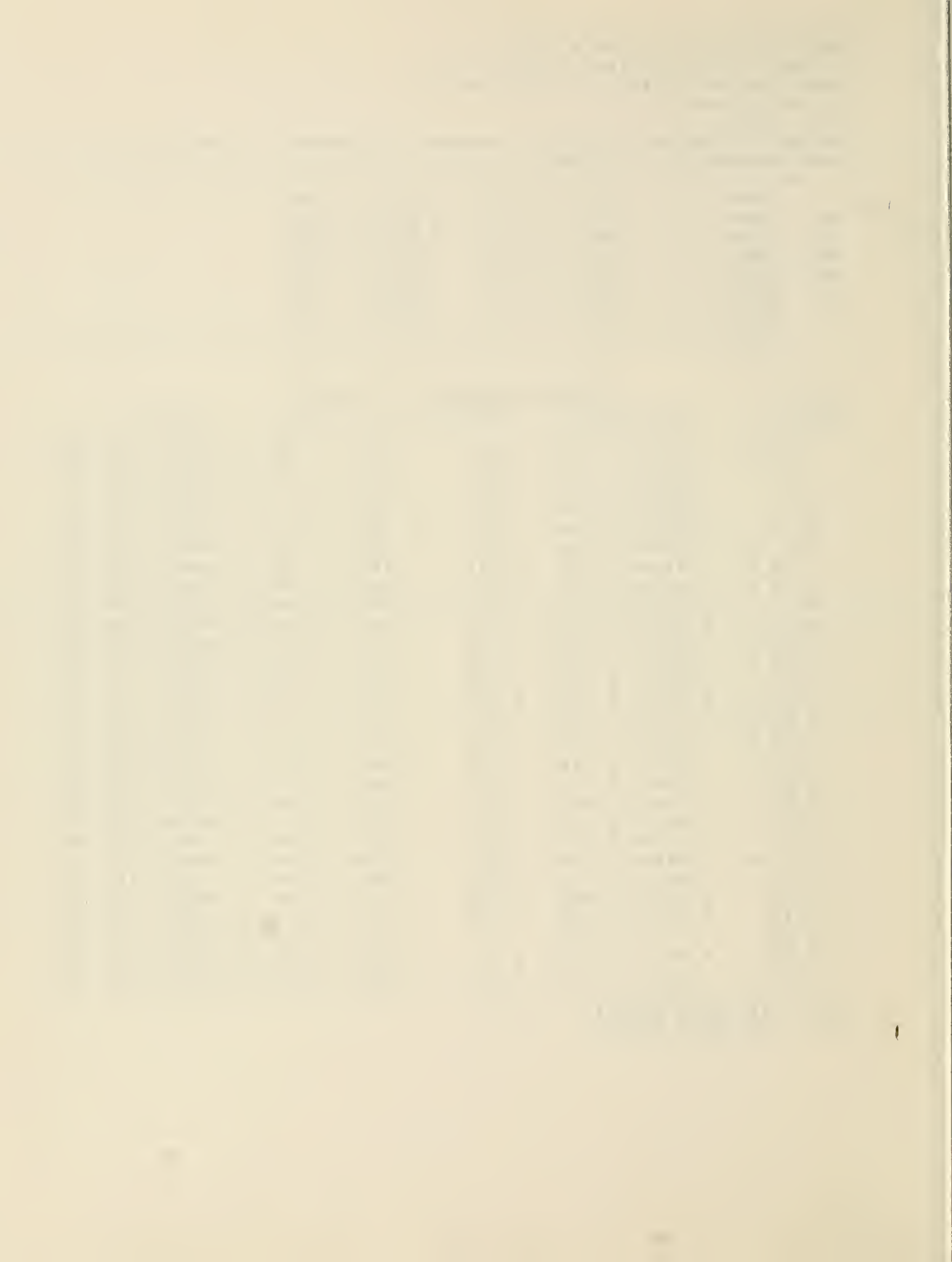
1	TRANS	*	0.046+-	0.023	0.463+-	0.244
20	GEO-R	*	9.226+-	0.918	93.600+-	17.509
47	SLAGM	*	0.299+-	0.201	3.036+-	2.092
64	ZHBLD	*	0.251+-	0.238	2.546+-	2.449
65	DRBLD	*	0.065+-	0.040	0.656+-	0.418
67	BLFUP	*	0.301+-	0.101	3.056+-	1.136
74	CUKST	*	0.220+-	0.106	2.235+-	1.134

TOTAL: 10.408+- 0.981 105.592+-19.466

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.410+-	0.063	4.156	0.330+-	0.032	0.805+-0.100 AL
2 SI *	1.326+-	0.214	13.454	1.137+-	0.109	0.857+-0.109 SI
3 P	0.022+-	0.003	0.228	0.016+-	0.002	0.721+-0.087 P
4 S	0.298+-	0.060	3.025	0.128+-	0.009	0.428+-0.031 S
5 CL	0.032+-	0.006	0.330	0.031+-	0.003	0.954+-0.107 CL
6 K *	0.139+-	0.024	1.410	0.122+-	0.011	0.880+-0.107 K
7 CA *	1.435+-	0.339	14.561	1.563+-	0.153	1.089+-0.158 CA
8 TI *	0.017+-	0.003	0.176	0.023+-	0.002	1.305+-0.203 TI
9 V	0.001+-	0.000	0.014	0.002+-	0.000	1.121+-0.149 V
10 CR	0.002+-	0.000	0.016	0.002+-	0.000	0.993+-0.109 CR
11 MN *	0.010+-	0.002	0.102	0.010+-	0.001	0.944+-0.096 MN
12 FE *	0.263+-	0.044	2.666	0.276+-	0.023	1.050+-0.126 FE
13 NI	0.001+-	0.000	0.015	0.002+-	0.000	1.123+-0.107 NI
14 CU *	0.139+-	0.056	1.409	0.139+-	0.012	1.001+-0.122 CU
15 ZH *	0.143+-	0.036	1.454	0.146+-	0.008	1.019+-0.075 ZH
16 AS *	0.027+-	0.008	0.272	0.027+-	0.002	1.000+-0.082 AS
17 SE	0.000+-	0.000	0.005	0.001+-	0.000	1.167+-0.300 SE
18 BR *	0.004+-	0.001	0.045	0.004+-	0.001	1.003+-0.384 BR
19 SR	0.004+-	0.001	0.040	0.003+-	0.000	0.784+-0.080 SR
20 PD	0.002+-	0.001	0.025	0.001+-	0.000	0.487+-0.090 PD
21 AG	0.002+-	0.001	0.017	0.001+-	0.000	0.774+-0.155 AG
22 CD *	0.028+-	0.008	0.287	0.028+-	0.002	1.000+-0.121 CD
23 IN	0.002+-	0.001	0.025	0.000+-	0.000	0.116+-0.151 IN
24 SH	0.005+-	0.002	0.052	0.004+-	0.000	0.805+-0.118 SH
25 SB	0.012+-	0.005	0.125	0.003+-	0.001	0.228+-0.070 SB
26 BA	<	0.001	---	0.001+-	0.002	0.000+-0.000 BA
27 HG	0.002+-	0.000	0.017	0.001+-	0.000	0.594+-0.077 HG
28 PB *	0.258+-	0.074	2.613	0.254+-	0.015	0.987+-0.082 PB

MEAS. AMB. MASS (UG/M3): 9.9

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QC114C

COARSE PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 11

CO-COLLECTED SAMPLES

SITE: SOUTH

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.903 D OF F: 6
CODE SOURCE FLG UG/M3 %

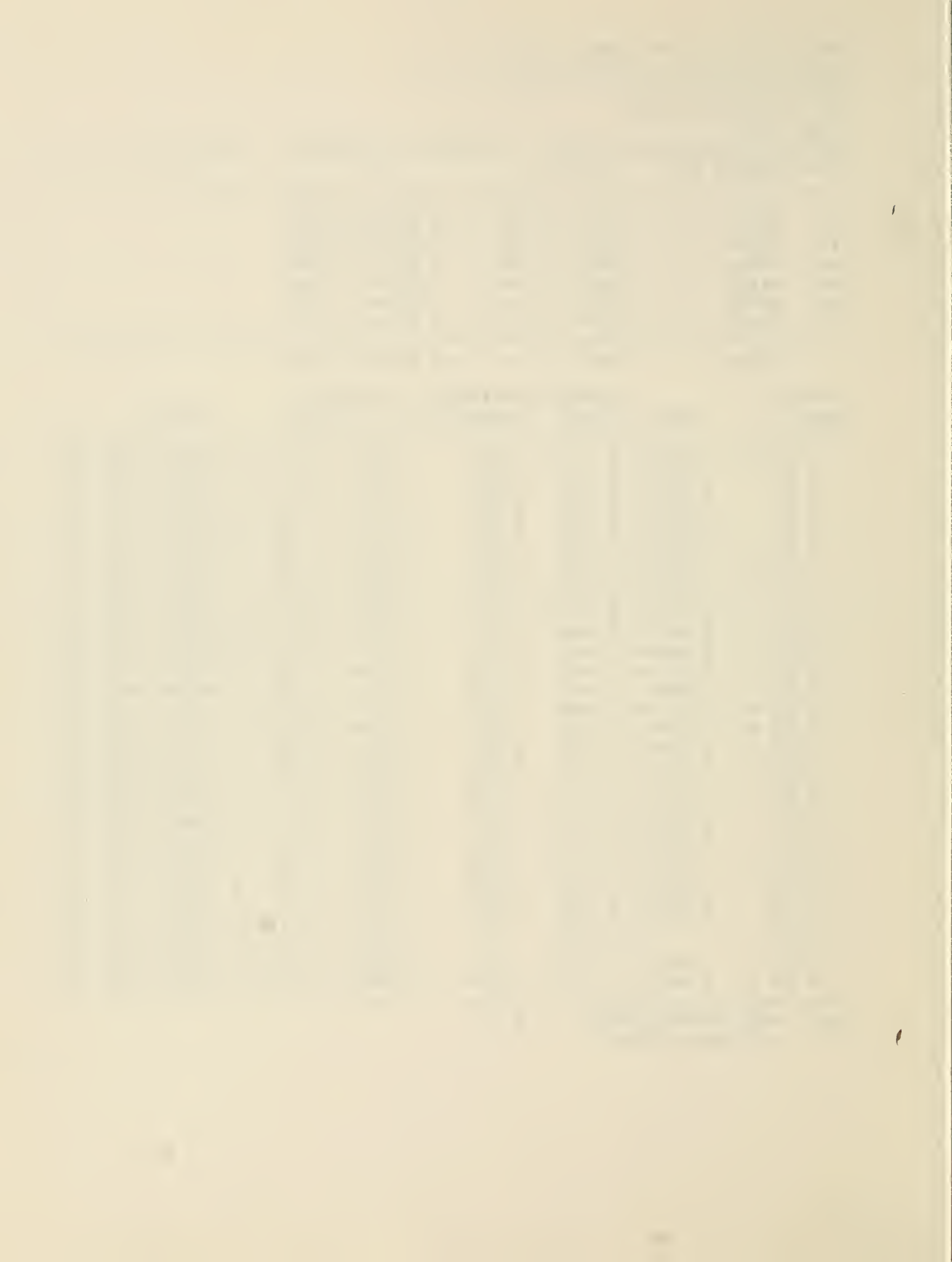
1	TRANS	*	0.046+-	0.024	0.471+-	0.258
20	GEO-R	*	9.017+-	0.937	92.476+-	18.079
47	SLAGM	*	0.311+-	0.209	3.194+-	2.203
64	ZNBLD	*	0.256+-	0.247	2.624+-	2.566
65	DRBLD	*	0.069+-	0.041	0.707+-	0.436
67	BLFUP	*	0.311+-	0.105	3.186+-	1.200
74	CUKST	*	0.228+-	0.110	2.340+-	1.191

TOTAL: 10.238+- 1.004 104.998+-20.206

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	0.405+-	0.066	4.153	0.323+-	0.031 0.798+-0.098 AL
2 SI *	1.297+-	0.220	13.300	1.114+-	0.107 0.859+-0.109 SI
3 P	0.022+-	0.004	0.231	0.016+-	0.002 0.713+-0.084 P
4 S	0.300+-	0.062	3.082	0.128+-	0.009 0.425+-0.031 S
5 CL	0.031+-	0.006	0.321	0.031+-	0.003 0.989+-0.113 CL
6 K *	0.137+-	0.025	1.407	0.120+-	0.011 0.276+-0.106 K
7 CA *	1.404+-	0.350	14.401	1.529+-	0.150 1.089+-0.158 CA
8 TI *	0.017+-	0.003	0.172	0.022+-	0.002 1.318+-0.205 TI
9 V	0.001+-	0.000	0.014	0.002+-	0.000 1.104+-0.145 V
10 CR	0.002+-	0.000	0.017	0.002+-	0.000 0.927+-0.097 CR
11 MN *	0.010+-	0.002	0.104	0.010+-	0.001 0.943+-0.095 MN
12 FE *	0.261+-	0.045	2.674	0.273+-	0.022 1.047+-0.124 FE
13 NI	0.002+-	0.000	0.016	0.002+-	0.000 1.062+-0.096 NI
14 CU *	0.143+-	0.058	1.468	0.143+-	0.012 1.001+-0.123 CU
15 ZH *	0.145+-	0.038	1.490	0.148+-	0.008 1.022+-0.075 ZH
16 AS *	0.028+-	0.008	0.284	0.028+-	0.002 1.001+-0.083 AS
17 SE	0.000+-	0.000	0.005	0.001+-	0.000 1.167+-0.295 SE
18 BR *	0.004+-	0.001	0.045	0.004+-	0.001 1.004+-0.386 BR
19 SR	0.004+-	0.001	0.039	0.003+-	0.000 0.797+-0.081 SR
20 PD	0.003+-	0.001	0.027	0.001+-	0.000 0.479+-0.085 PD
21 AG	0.002+-	0.001	0.017	0.001+-	0.000 0.778+-0.154 AG
22 CD *	0.029+-	0.008	0.296	0.029+-	0.002 1.004+-0.122 CD
23 IH	0.002+-	0.001	0.026	0.000+-	0.000 0.121+-0.148 IH
24 SH	0.005+-	0.002	0.054	0.004+-	0.000 0.794+-0.113 SH
25 SB	0.013+-	0.005	0.130	0.003+-	0.001 0.230+-0.067 SB
26 BA	<	0.001	---	0.001+-	0.002 0.000+-0.000 BA
27 HG	0.002+-	0.000	0.017	0.001+-	0.000 0.594+-0.076 HG
28 PB *	0.263+-	0.077	2.699	0.256+-	0.015 0.973+-0.080 PB

MEAS. AMB. MASS (UG/M3): 9.8

* - FITTING ELEMENT



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BEL: PRT011 -FORM -COPIES 1

DDLED: 06/22/82 15:07

ARTED: 06/22/82 15:18, ON: CE2P BY: 9



CMBDE9 RESULTS FOR CMB # QT11.4

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 4 SITE CODE: 11

ALL VALID SAMPLES

SITE: SOUTH

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.590 D OF F: 4
CODE SOURCE FLG UG/M3 %

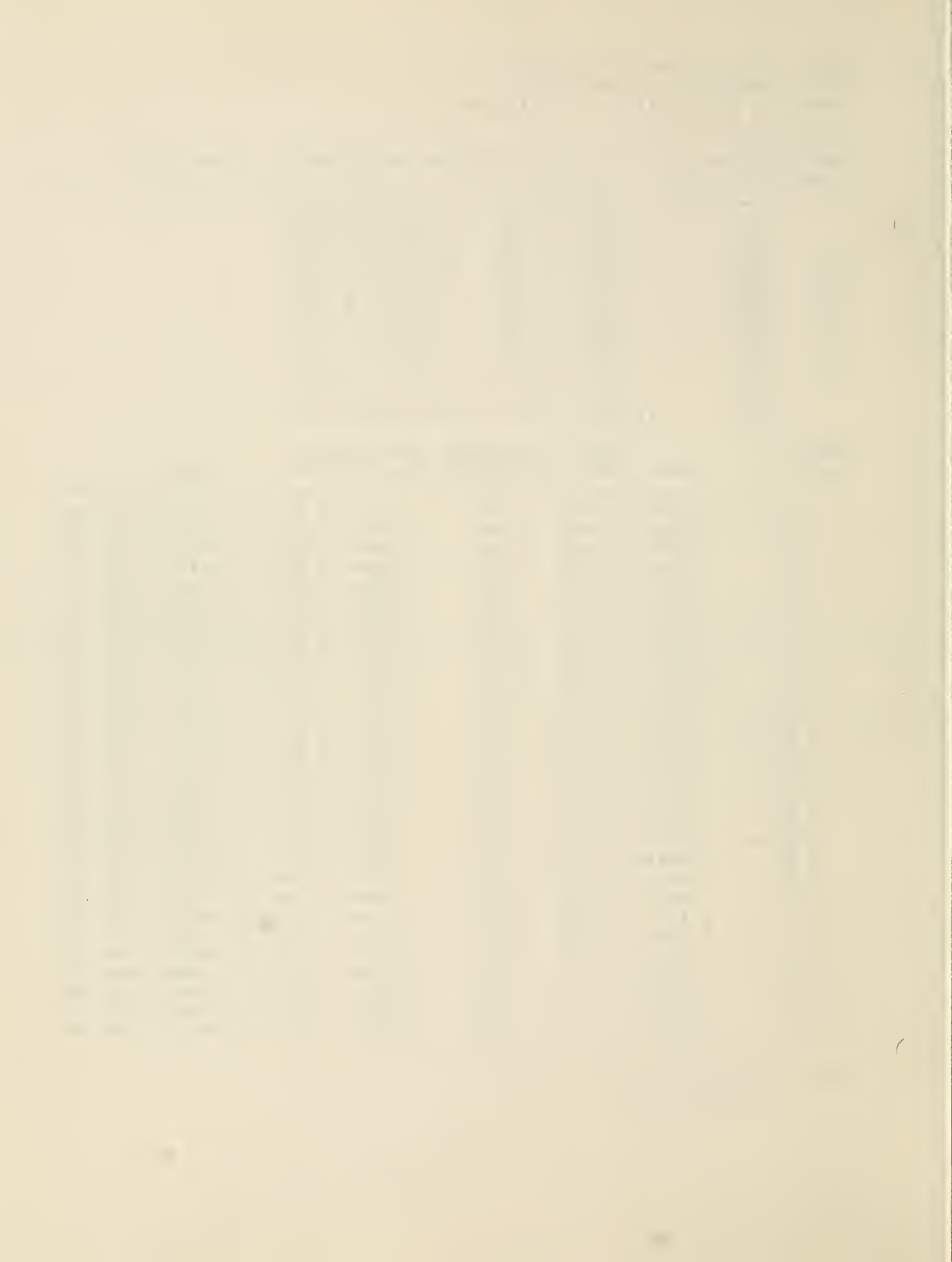
1	TRANS	*	0.281+-	0.130	1.138+-	0.550
20	GEO-R	*	9.897+-	3.044	40.090+-	13.635
36	COALI	*	5.123+-	2.793	20.751+-	11.709
47	SLAGM	*	0.648+-	0.266	2.627+-	1.143
64	ZNBLD	*	1.155+-	0.520	4.679+-	2.212
65	DRBLD	*	0.298+-	0.128	1.206+-	0.548
67	BLFUP	*	0.918+-	0.248	3.718+-	1.141
74	CUKST	*	0.452+-	0.194	1.829+-	0.829
79	WSTOV	*	2.691+-	1.386	10.900+-	5.833

TOTAL: 21.463+- 4.412 86.938+-21.876

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.629+-	0.082	2.547	0.620+-	0.041	0.986+-0.093 AL
2 SI *	2.237+-	0.309	9.062	1.947+-	0.134	0.870+-0.079 SI
3 P	0.065+-	0.009	0.264	0.028+-	0.002	0.436+-0.030 P
4 S	1.018+-	0.175	4.125	0.289+-	0.020	0.284+-0.020 S
5 CL	0.056+-	0.011	0.228	0.083+-	0.010	1.476+-0.303 CL
6 K *	0.262+-	0.036	1.061	0.262+-	0.013	1.002+-0.068 K
7 CA *	2.366+-	0.473	9.585	2.057+-	0.173	0.869+-0.097 CA
8 TI *	0.029+-	0.004	0.117	0.033+-	0.002	1.156+-0.122 TI
9 V	0.002+-	0.000	0.008	0.002+-	0.000	1.031+-0.122 V
10 CR	0.003+-	0.000	0.011	0.003+-	0.000	1.073+-0.083 CR
11 MN *	0.017+-	0.003	0.070	0.017+-	0.001	0.951+-0.085 MN
12 FE *	0.430+-	0.067	1.742	0.456+-	0.027	1.060+-0.092 FE
13 NI	0.004+-	0.001	0.015	0.004+-	0.000	0.991+-0.066 NI
14 CU *	0.291+-	0.102	1.178	0.290+-	0.025	0.998+-0.119 CU
15 ZN *	0.375+-	0.086	1.520	0.372+-	0.023	0.992+-0.086 ZN
16 AS *	0.113+-	0.028	0.458	0.113+-	0.009	1.000+-0.117 AS
17 SE	0.002+-	0.001	0.009	0.002+-	0.000	0.813+-0.079 SE
18 BR *	0.021+-	0.004	0.087	0.022+-	0.007	1.008+-0.483 BR
19 SR	0.009+-	0.001	0.037	0.006+-	0.000	0.649+-0.044 SR
20 PD	0.003+-	0.001	0.013	0.007+-	0.000	2.256+-0.376 PD
21 AG	0.005+-	0.002	0.019	0.004+-	0.000	0.909+-0.124 AG
22 CD *	0.104+-	0.026	0.423	0.104+-	0.009	0.991+-0.127 CD
23 IN	0.005+-	0.002	0.019	0.002+-	0.001	0.417+-0.141 IN
24 SN	0.010+-	0.003	0.043	0.013+-	0.001	1.223+-0.144 SN
25 SB	0.035+-	0.011	0.141	0.018+-	0.002	0.503+-0.060 SB
26 BA	0.015+-	0.007	0.062	0.010+-	0.003	0.679+-0.263 BA
27 HG	0.002+-	0.001	0.009	0.001+-	0.000	0.679+-0.125 HG
28 PB *	0.729+-	0.196	2.952	0.723+-	0.043	0.992+-0.084 PB

MEAS. AMB. MASS (UG/M3): 24.7

* - FITTING ELEMENT



ER: E400

2 7


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M      MMM      MMM
M  M  M  M  M  M
M  M  M  M  M  M
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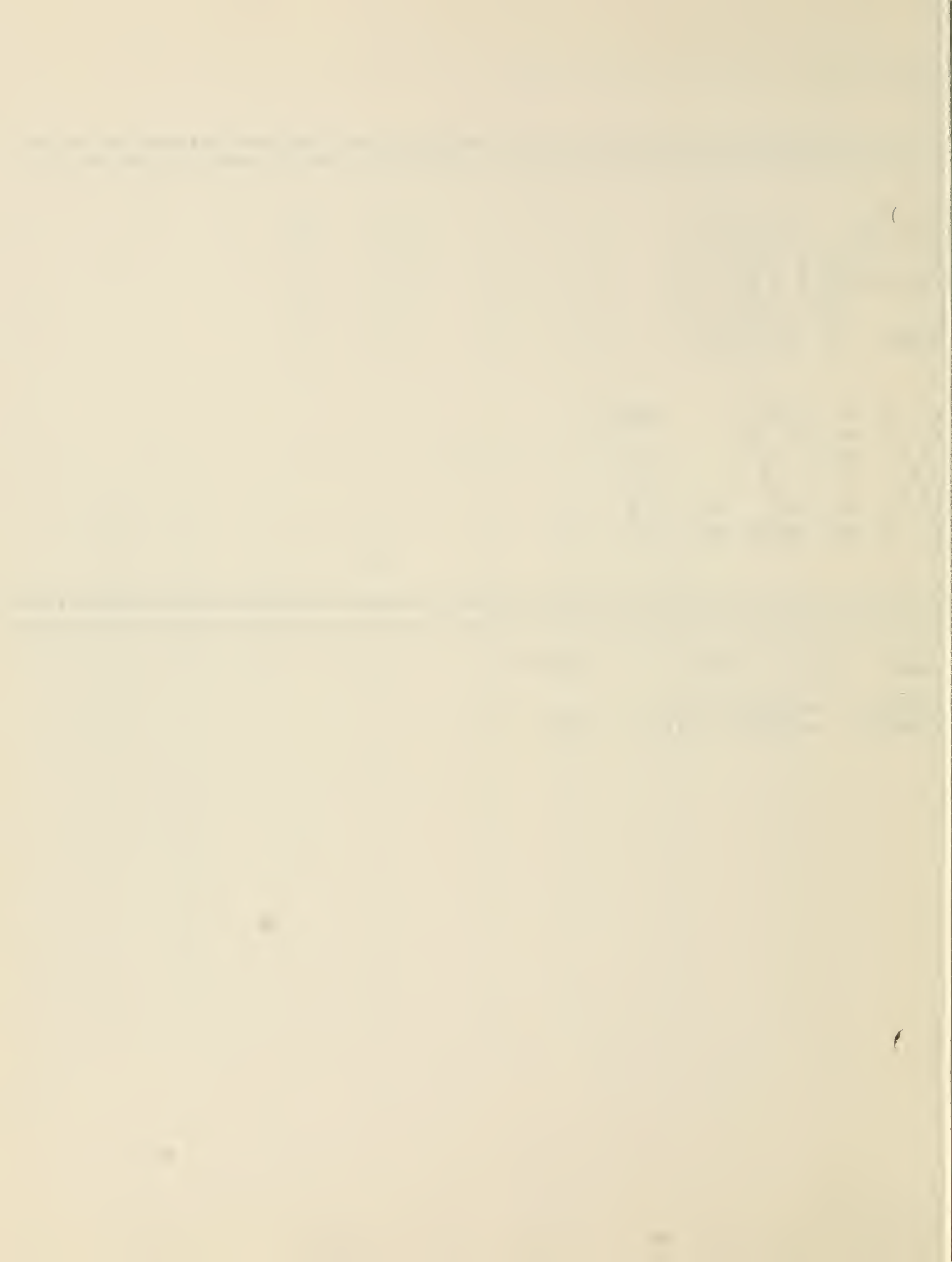
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BEL: PRT014 -FORM -COPIES 1

DOLED: 06/22/82 15:08

ARTED: 06/22/82 15:21, ON: CE2P BY: Q



CMBDEQ RESULTS FOR CMB # QT12.1

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 12

ALL VALID SAMPLES

SITE: VOLLMER

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.212 D OF F: 5

CODE SOURCE FLG UG/M3 %

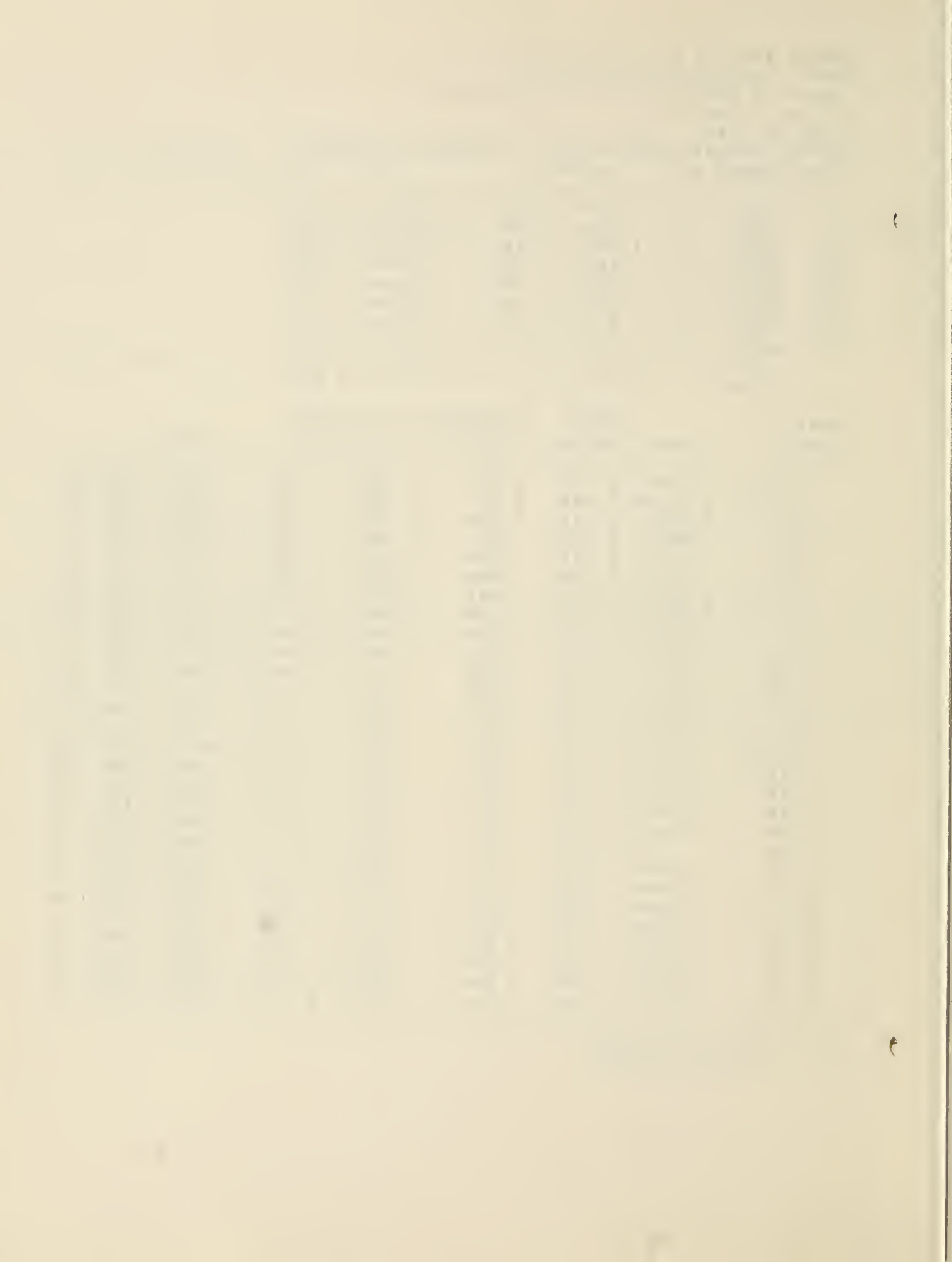
1	TRANS	*	0.225+-	0.123	0.816+-	0.464
5	GEO-C	*	7.245+-	0.981	26.206+-	5.416
26	LIME	*	5.187+-	1.825	18.761+-	7.223
66	ZNRGB	*	0.482+-	0.216	1.744+-	0.829
68	MSSTK	*	1.830+-	0.509	6.620+-	2.110
70	BGSTK	*	0.072+-	0.087	0.159+-	0.317
74	CUKST	*	0.238+-	0.108	0.860+-	0.412
79	WSTOV	*	12.157+-	3.047	43.973+-	12.987

TOTAL:	27.437+-	3.731	99.241+-	20.553
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.779+-	0.139	2.818	0.785+-	0.069	1.008+-0.125 AL
2 SI *	2.678+-	0.494	9.688	2.736+-	0.250	1.021+-0.133 SI
3 P	0.072+-	0.012	0.260	0.047+-	0.003	0.650+-0.045 P
4 S	1.291+-	0.262	4.670	0.484+-	0.030	0.375+-0.025 S
5 CL	0.070+-	0.015	0.252	0.096+-	0.006	1.376+-0.146 CL
6 K *	0.547+-	0.094	1.980	0.548+-	0.024	1.001+-0.061 K
7 CA *	2.086+-	0.486	7.546	2.092+-	0.155	1.003+-0.105 CA
8 TI *	0.035+-	0.007	0.126	0.036+-	0.003	1.049+-0.124 TI
9 V	0.002+-	0.001	0.008	0.002+-	0.000	0.912+-0.126 V
10 CR	0.004+-	0.001	0.014	0.003+-	0.000	0.627+-0.065 CR
11 MH *	0.017+-	0.004	0.062	0.017+-	0.001	0.982+-0.112 MH
12 FE *	0.467+-	0.100	1.689	0.407+-	0.029	0.871+-0.081 FE
13 NI	0.002+-	0.001	0.009	0.003+-	0.000	1.345+-0.162 NI
14 CU *	0.164+-	0.056	0.592	0.164+-	0.013	1.000+-0.114 CU
15 ZN *	0.376+-	0.107	1.361	0.371+-	0.027	0.987+-0.101 ZN
16 AS *	0.121+-	0.045	0.439	0.097+-	0.008	0.800+-0.087 AS
17 SE	0.002+-	0.001	0.007	0.002+-	0.000	1.232+-0.207 SE
18 BR *	0.018+-	0.005	0.065	0.018+-	0.006	0.969+-0.451 BR
19 SR	0.006+-	0.001	0.021	0.007+-	0.000	1.304+-0.132 SR
20 PD	<	0.001	---	0.002+-	0.000	0.000+-0.000 PD
21 AG	0.005+-	0.003	0.019	0.005+-	0.001	0.923+-0.222 AG
22 CD *	0.044+-	0.018	0.158	0.043+-	0.003	0.978+-0.097 CD
23 IN	0.005+-	0.002	0.017	0.001+-	0.001	0.125+-0.176 IN
24 SN	0.022+-	0.007	0.081	0.008+-	0.001	0.373+-0.070 SN
25 SB	0.022+-	0.012	0.078	0.039+-	0.004	1.790+-0.357 SB
26 BA	0.063+-	0.027	0.228	0.003+-	0.007	0.053+-0.106 BA
27 HG	0.001+-	0.000	0.002	0.004+-	0.000	6.226+-4.152 HG
28 PB *	0.529+-	0.158	1.915	0.629+-	0.050	1.187+-0.146 PB

MEAS. AMB. MASS (UG/M3): 27.6

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT12 1

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 1 SITE CODE: 12

ALL VALID SAMPLES

SITE: VOLLMER

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.291 D OF F: 6

CODE SOURCE FLG UG/M3 %

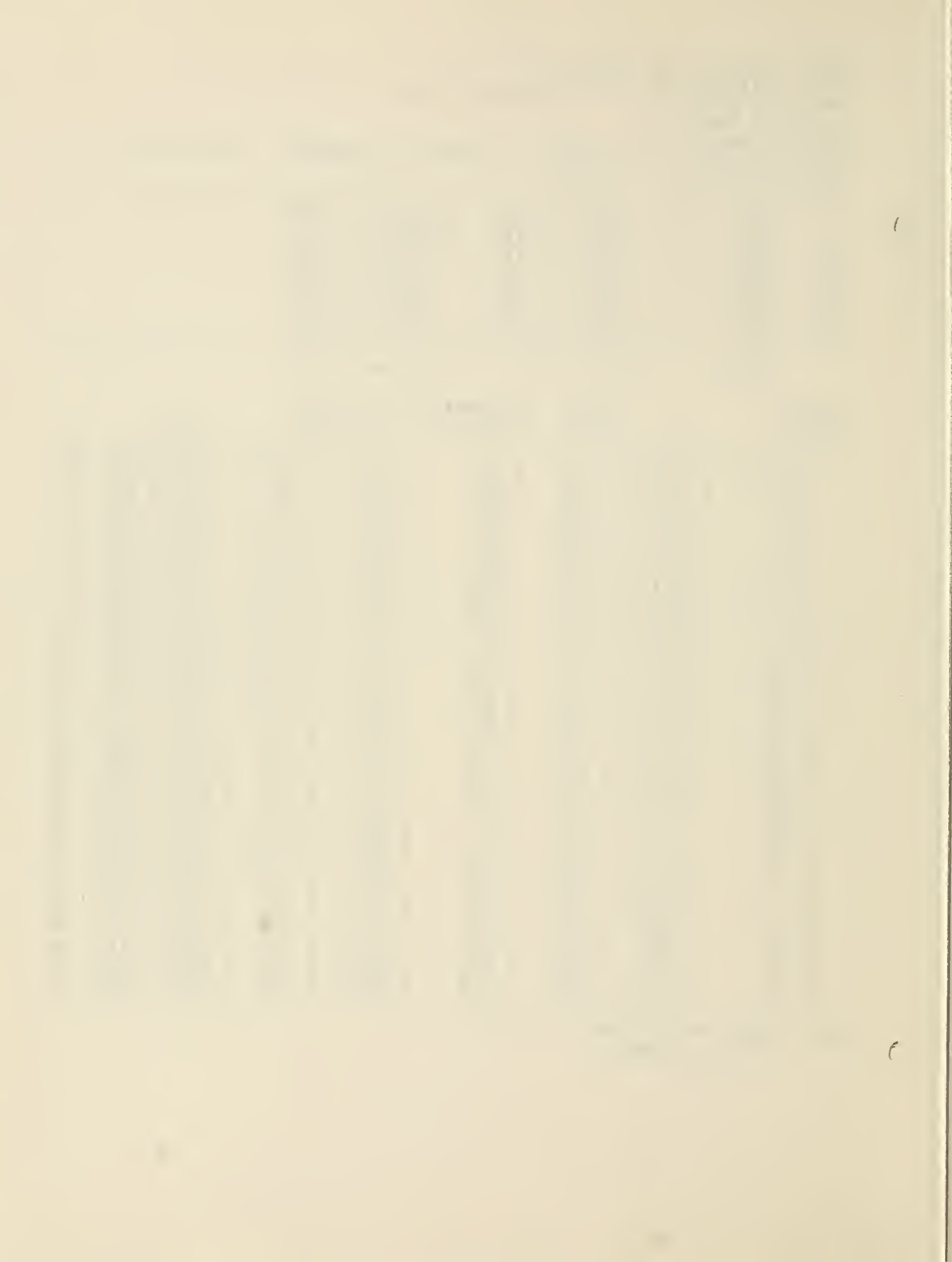
1	TRANS	*	0.222+-	0.122	0.803+-	0.458
5	GED-C	*	7.154+-	0.973	25.878+-	5.360
26	LIME	*	5.171+-	1.825	18.703+-	7.218
66	ZHROB	*	0.481+-	0.216	1.739+-	0.829
68	MSSTK	*	2.014+-	0.463	7.284+-	2.025
74	CUKST	*	0.233+-	0.107	0.843+-	0.410
79	WSTOV	*	12.185+-	3.046	44.074+-	12.993

TOTAL: 27.460+- 3.721 99.324+-20.539

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.779+-	0.139	2.818	0.778+-	0.068	0.999+-0.123 AL
2 SI *	2.678+-	0.494	9.688	2.710+-	0.247	1.012+-0.131 SI
3 P	0.072+-	0.012	0.260	0.047+-	0.003	0.661+-0.046 P
4 S	1.291+-	0.262	4.670	0.503+-	0.032	0.389+-0.027 S
5 CL	0.070+-	0.015	0.252	0.094+-	0.006	1.346+-0.153 CL
6 K *	0.547+-	0.094	1.980	0.547+-	0.024	1.000+-0.061 K
7 CA *	2.086+-	0.486	7.546	2.088+-	0.154	1.001+-0.104 CA
8 TI *	0.035+-	0.007	0.126	0.036+-	0.003	1.047+-0.122 TI
9 V	0.002+-	0.001	0.008	0.002+-	0.000	0.907+-0.125 V
10 CR	0.004+-	0.001	0.014	0.003+-	0.000	0.642+-0.068 CR
11 MH *	0.017+-	0.004	0.062	0.018+-	0.001	1.019+-0.122 MH
12 FE *	0.467+-	0.100	1.689	0.415+-	0.029	0.888+-0.083 FE
13 NI	0.002+-	0.001	0.009	0.003+-	0.000	1.383+-0.173 NI
14 CU *	0.164+-	0.056	0.592	0.164+-	0.013	1.001+-0.113 CU
15 ZH *	0.376+-	0.107	1.361	0.368+-	0.027	0.978+-0.101 ZH
16 AS *	0.121+-	0.045	0.439	0.103+-	0.009	0.849+-0.098 AS
17 SE	0.002+-	0.001	0.007	0.003+-	0.000	1.328+-0.232 SE
18 BR *	0.018+-	0.005	0.065	0.017+-	0.006	0.959+-0.442 BR
19 SR	0.006+-	0.001	0.021	0.008+-	0.000	1.367+-0.146 SR
20 PD	<	0.001	---	0.002+-	0.001	0.000+-0.000 PD
21 AG	0.005+-	0.003	0.019	0.005+-	0.001	0.984+-0.245 AG
22 CD *	0.044+-	0.018	0.158	0.028+-	0.003	0.650+-0.075 CD
23 IH	0.005+-	0.002	0.017	0.001+-	0.001	0.127+-0.175 IH
24 SH	0.022+-	0.007	0.081	0.008+-	0.002	0.373+-0.073 SH
25 SB	0.022+-	0.012	0.078	0.042+-	0.004	1.940+-0.411 SB
26 BA	0.063+-	0.027	0.228	0.003+-	0.007	0.055+-0.111 BA
27 HG	0.001+-	0.000	0.002	0.004+-	0.000	6.697+-4.835 HG
28 PB *	0.529+-	0.158	1.915	0.655+-	0.055	1.236+-0.164 PB

MEAS. AMB. MASS (UG/M3): 27.6

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT12.2

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 12

ALL VALID SAMPLES

SITE: VOLLMER

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.037 D OF F: 6

CODE SOURCE FLG UG/M3 %

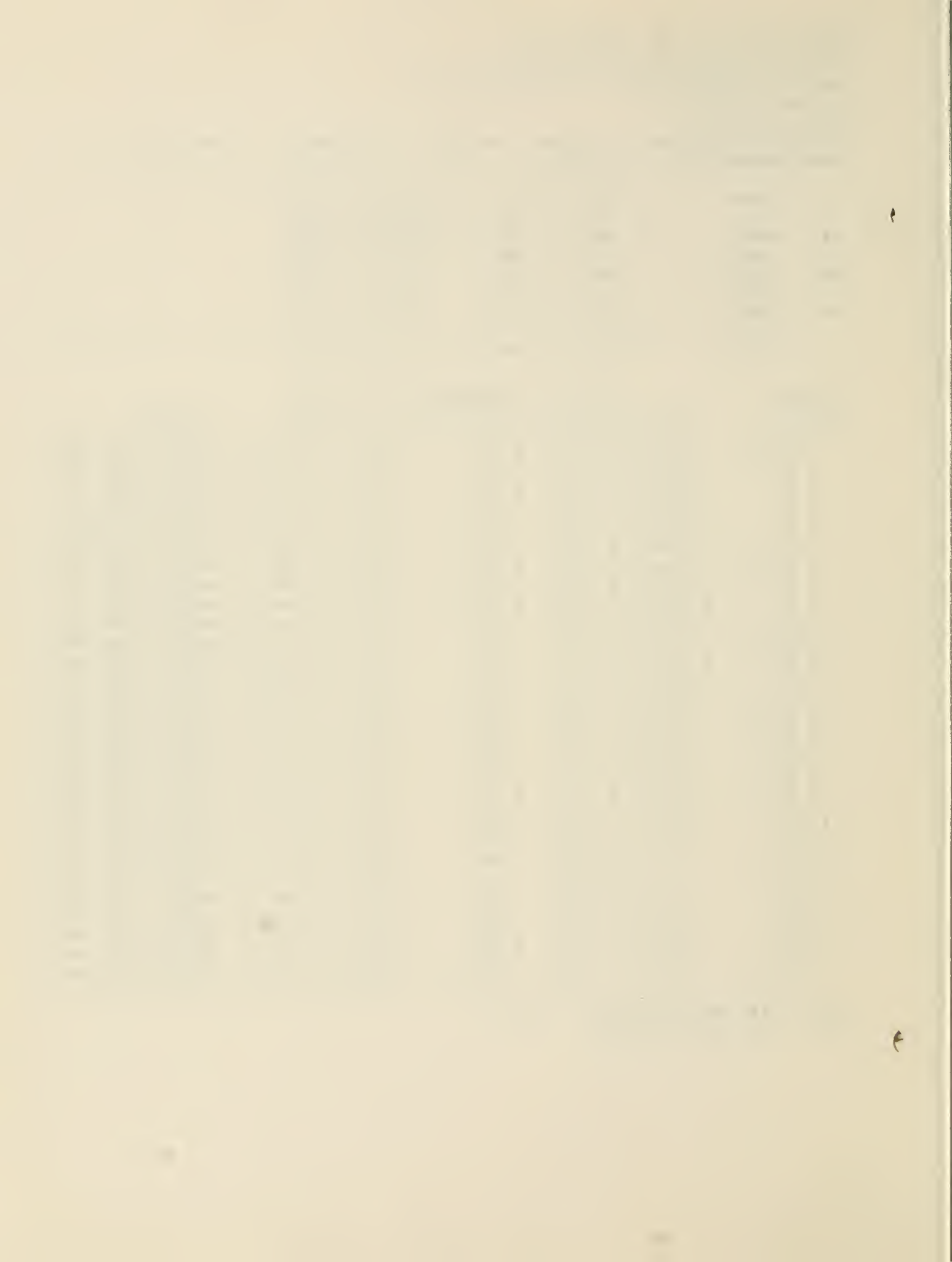
1	TRANS	*	0.092+-	0.041	0.405+-	0.230
5	GEO-C	*	14.740+-	2.474	65.033+-	24.976
65	DRBLD	*	0.063+-	0.057	0.277+-	0.267
66	ZNBGB	*	0.303+-	0.067	1.337+-	0.549
68	MSSTK	*	0.490+-	0.216	2.161+-	1.211
70	BGSTK	*	0.044+-	0.029	0.194+-	0.145
74	CUKST	*	0.023+-	0.038	0.366+-	0.211

TOTAL:	15.815+-	2.486	69.773+-	26.480
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO			
1 AL *	1.230+-	0.624	5.427	1.396+-	0.139	1.135+-	0.171	AL
2 SI *	4.882+-	2.822	21.541	5.088+-	0.507	1.042+-	0.150	SI
3 P	0.056+-	0.013	0.247	0.033+-	0.003	0.597+-	0.060	P
4 S	0.573+-	0.065	2.527	0.143+-	0.009	0.250+-	0.017	S
5 CL	0.030+-	0.009	0.135	0.030+-	0.002	0.991+-	0.113	CL
6 K *	0.292+-	0.137	1.290	0.263+-	0.025	0.899+-	0.117	K
7 CA *	0.846+-	0.207	3.735	0.848+-	0.083	1.002+-	0.139	CA
8 TI *	0.057+-	0.033	0.252	0.061+-	0.006	1.064+-	0.152	TI
9 V	0.003+-	0.002	0.015	0.003+-	0.000	1.006+-	0.141	V
10 CR	0.003+-	0.002	0.012	0.003+-	0.000	1.065+-	0.140	CR
11 MH *	0.018+-	0.007	0.081	0.016+-	0.001	0.986+-	0.105	MH
12 FE *	0.560+-	0.263	2.471	0.568+-	0.053	1.014+-	0.136	FE
13 NI	0.002+-	0.001	0.008	0.002+-	0.000	0.982+-	0.132	NI
14 CU *	0.059+-	0.020	0.262	0.059+-	0.005	1.000+-	0.109	CU
15 ZH *	0.202+-	0.029	0.890	0.202+-	0.016	0.999+-	0.115	ZH
16 AS *	0.046+-	0.009	0.205	0.046+-	0.003	0.999+-	0.092	AS
17 SE	0.002+-	0.000	0.007	0.001+-	0.000	0.636+-	0.118	SE
18 BR *	0.008+-	0.001	0.034	0.008+-	0.002	1.000+-	0.433	BR
19 SR	0.004+-	0.001	0.016	0.004+-	0.000	1.204+-	0.148	SR
20 PD	0.000+-	0.000	0.001	0.001+-	0.000	3.873+-	0.116	PD
21 AG	0.007+-	0.002	0.032	0.002+-	0.001	0.233+-	0.089	AG
22 CD *	0.020+-	0.006	0.086	0.020+-	0.001	0.999+-	0.108	CD
23 IN	<	0.001	---	0.000+-	0.001	0.000+-	0.000	IN
24 SH	0.002+-	0.002	0.004	0.005+-	0.001	2.583+-	1.700	SH
25 SB	0.019+-	0.008	0.083	0.016+-	0.002	0.842+-	0.148	SB
26 BA	0.035+-	0.017	0.154	0.001+-	0.006	0.029+-	0.165	BA
27 HG	0.001+-	0.000	0.005	0.002+-	0.000	1.382+-	0.254	HG
28 PB *	0.235+-	0.043	1.039	0.237+-	0.014	1.006+-	0.086	PB

MEAS. AMS. MASS (UG/M3): 22.7

* - FITTING ELEMENT



CMBDEG RESULTS FOR CMB # QT1220

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 2 SITE CODE: 12

CO-COLLECTED SAMPLES

SITE: VOLLMER

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.037 D OF F: 6

CODE SOURCE FLG UG/M3

1	TRANS	*	0.092+-	0.042	0.399+-	0.234
5	GEO-C	*	15.397+-	2.622	66.972+-	26.899
65	DRBLD	*	0.076+-	0.058	0.332+-	0.279
66	ZHBGB	*	0.305+-	0.071	1.326+-	0.572
68	MSSTK	*	0.399+-	0.209	1.734+-	1.108
70	BGSTK	*	0.054+-	0.031	0.233+-	0.158
74	CUKST	*	0.088+-	0.041	0.381+-	0.225

TOTAL: 16.410+- 2.633 71.378+-28.377

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	1.273+-	0.665	5.538	1.457+-	0.145	1.144+-0.173 AL
2 SI *	5.068+-	3.010	22.043	5.311+-	0.529	1.048+-0.151 SI
3 P	0.058+-	0.014	0.251	0.034+-	0.003	0.590+-0.060 P
4 S	0.566+-	0.069	2.461	0.133+-	0.008	0.234+-0.015 S
5 CL	0.032+-	0.009	0.141	0.031+-	0.002	0.948+-0.102 CL
6 K *	0.305+-	0.146	1.325	0.274+-	0.027	0.898+-0.117 K
7 CA *	0.883+-	0.218	3.841	0.882+-	0.087	0.999+-0.139 CA
8 TI *	0.060+-	0.035	0.260	0.063+-	0.006	1.061+-0.152 TI
9 V	0.004+-	0.002	0.016	0.004+-	0.000	0.964+-0.133 V
10 CR	0.003+-	0.002	0.012	0.003+-	0.000	1.093+-0.147 CR
11 MN *	0.019+-	0.007	0.081	0.016+-	0.001	0.881+-0.106 MN
12 FE *	0.577+-	0.281	2.511	0.586+-	0.056	1.015+-0.138 FE
13 NI	0.002+-	0.001	0.007	0.002+-	0.000	1.030+-0.147 NI
14 CU *	0.061+-	0.021	0.265	0.061+-	0.005	1.000+-0.112 CU
15 ZH *	0.201+-	0.031	0.873	0.201+-	0.016	0.999+-0.116 ZH
16 AS *	0.046+-	0.009	0.200	0.046+-	0.003	0.999+-0.093 AS
17 SE	0.001+-	0.000	0.007	0.001+-	0.000	0.626+-0.127 SE
18 BR *	0.008+-	0.001	0.034	0.008+-	0.002	1.000+-0.433 BR
19 SR	0.003+-	0.001	0.015	0.004+-	0.000	1.226+-0.158 SR
20 PD	0.000+-	0.000	0.001	0.001+-	0.000	3.251+-4.055 PD
21 AG	0.008+-	0.002	0.033	0.002+-	0.001	0.200+-0.084 AG
22 CD *	0.021+-	0.006	0.091	0.021+-	0.002	0.999+-0.111 CD
23 IN	<	0.001	---	0.000+-	0.001	0.000+-0.000 IN
24 SH	0.002+-	0.002	0.004	0.005+-	0.001	2.468+-1.595 SH
25 SB	0.018+-	0.008	0.077	0.015+-	0.002	0.839+-0.161 SB
26 BA	0.037+-	0.018	0.162	0.001+-	0.006	0.024+-0.160 BA
27 HG	0.001+-	0.000	0.005	0.002+-	0.000	1.293+-0.239 HG
28 PB *	0.218+-	0.042	0.946	0.219+-	0.012	1.006+-0.080 PB

MEAS. AMB. MASS (UG/M3): 23.0

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # QT12.3

TOTAL PARTICULATE FRACTION

SAMPLING DATE: QTR 3 SITE CODE: 12

ALL VALID SAMPLES

SITE: VOLLMER

EFFECTIVE VARIANCE FITTING: REDUCED CHI SQUARE = 0.836 D OF F: 6

CODE SOURCE FLG UG/M3 %

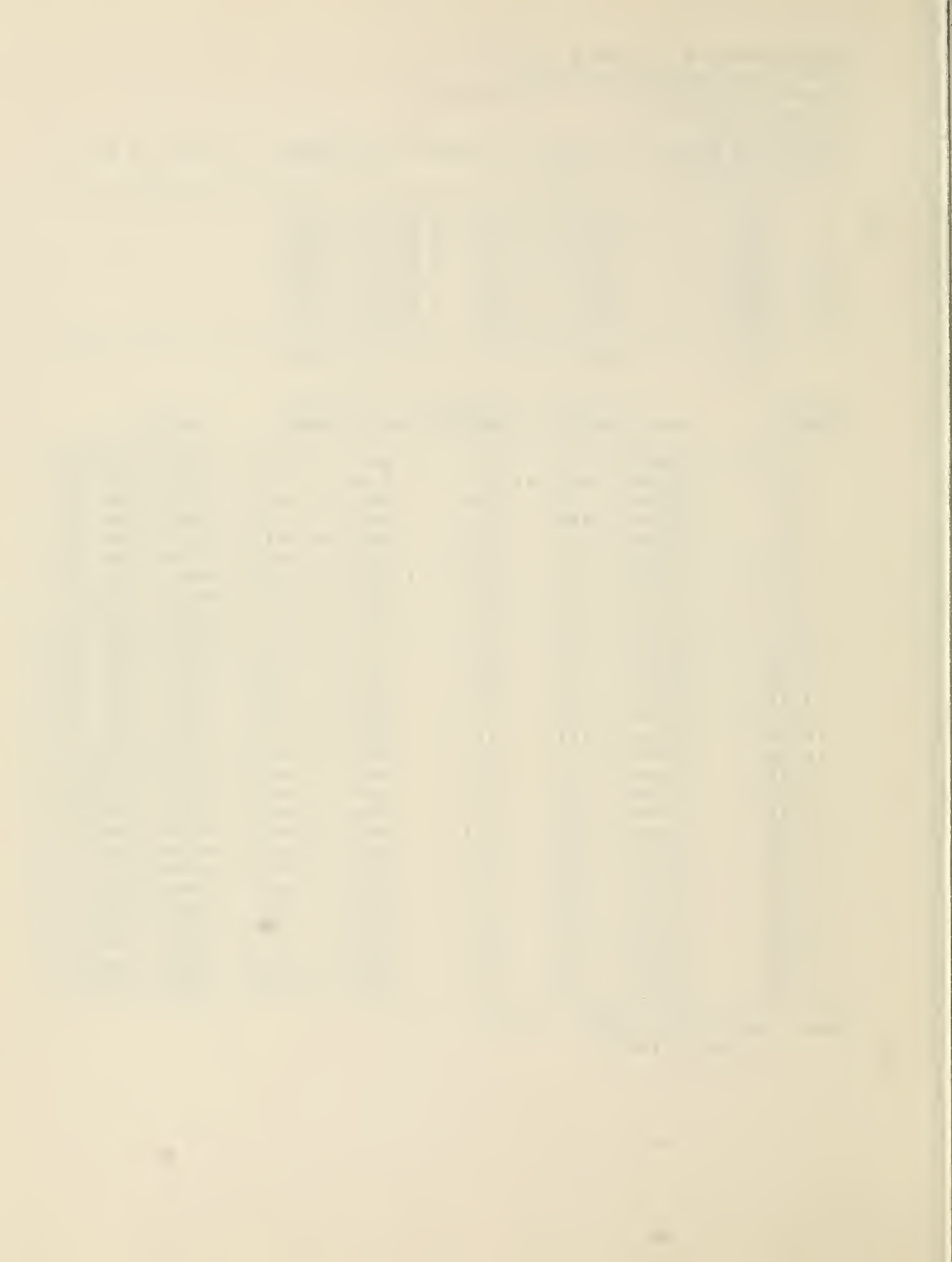
1	TRANS	*	0.106+- 0.048	0.220+- 0.108
5	GEO-C	*	28.368+- 2.343	58.909+-12.426
26	LIME	*	1.179+- 0.978	2.448+- 2.086
66	ZHBGB	*	0.316+- 0.161	0.656+- 0.358
68	MSSTK	*	0.802+- 0.228	1.665+- 0.574
70	BGSTK	*	0.052+- 0.043	0.108+- 0.091
74	CUKST	*	0.067+- 0.022	0.139+- 0.052

TOTAL: 30.889+- 2.555 64.144+-13.533

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	2.324+- 0.354	4.827	2.695+- 0.267	1.159+-0.176	AL
2 SI *	8.822+- 1.462	18.320	9.814+- 0.975	1.112+-0.165	SI
3 P	0.081+- 0.009	0.168	0.062+- 0.006	0.770+-0.086	P
4 S	0.652+- 0.046	1.354	0.245+- 0.016	0.376+-0.026	S
5 CL	0.047+- 0.008	0.097	0.057+- 0.004	1.223+-0.152	CL
6 K *	0.691+- 0.091	1.435	0.502+- 0.049	0.727+-0.088	K
7 CA *	1.965+- 0.179	4.081	1.961+- 0.163	0.998+-0.117	CA
8 TI *	0.119+- 0.023	0.247	0.117+- 0.011	0.985+-0.136	TI
9 Y	0.006+- 0.001	0.013	0.007+- 0.001	1.018+-0.143	Y
10 CR	0.007+- 0.001	0.014	0.006+- 0.001	0.826+-0.098	CR
11 MN *	0.030+- 0.005	0.062	0.031+- 0.003	1.028+-0.132	MN
12 FE *	1.085+- 0.190	2.253	1.085+- 0.103	1.000+-0.134	FE
13 NI	0.002+- 0.001	0.004	0.002+- 0.000	1.228+-0.235	NI
14 CU *	0.056+- 0.010	0.117	0.056+- 0.004	1.000+-0.097	CU
15 ZN *	0.233+- 0.081	0.484	0.232+- 0.017	0.997+-0.105	ZN
16 AS *	0.054+- 0.011	0.112	0.048+- 0.004	0.892+-0.095	AS
17 SE	0.001+- 0.000	0.002	0.002+- 0.000	2.011+-0.841	SE
18 BR *	0.010+- 0.001	0.022	0.010+- 0.003	0.982+-0.373	BR
19 SR	0.009+- 0.001	0.018	0.008+- 0.001	0.948+-0.103	SR
20 PD	0.001+- 0.001	0.003	0.001+- 0.001	0.502+-0.746	PD
21 AG	0.002+- 0.002	0.005	0.002+- 0.001	0.946+-0.705	AG
22 CD *	0.027+- 0.009	0.056	0.027+- 0.002	0.993+-0.123	CD
23 IN	0.009+- 0.004	0.019	0.000+- 0.002	0.018+-0.221	IN
24 SN	0.006+- 0.003	0.013	0.005+- 0.002	0.730+-0.398	SN
25 SB	0.007+- 0.005	0.015	0.023+- 0.004	3.084+-1.744	SB
26 BA	0.062+- 0.021	0.128	0.001+- 0.011	0.024+-0.179	BA
27 HG	0.002+- 0.001	0.004	0.003+- 0.000	1.279+-0.253	HG
28 PB *	0.296+- 0.078	0.615	0.346+- 0.023	1.168+-0.118	PB

MEAS. AMB. MASS (UG/M3): 48.2

* - FITTING ELEMENT



Appendix J

Audits, Calibrations and Site Descriptions Performed by Ambient Technology For The East Helena Aerosol Study

1. System Audit of the Ambient Lead Monitoring Project Operated in East Helena by the State of Montana Air Quality Bureau 2-5-81
2. Performance Audit of the Ambient Air Monitoring Network of the East Helena Lead Study Operated by the State of Montana Air Quality Bureau 2-27-81
3. Investigation of Calibration Techniques for the NEA Low Volume Sampler 4-22-81
4. Performance Audit of the East Helena Lead Study: Flow Rates Through Samplers; Laboratory Unknowns 4/23/81
5. Investigation of Calibration Technique for the Dichotomous Sampler 4-27-81
6. Additional Site Descriptions - undated
7. Performance Audit of the East Helena Lead Study: Flow Rates Through Samplers 6-7-81
8. Performance Audit of the East Helena Lead Study: Flow Rates Through Samplers: Laboratory Unknowns 8-11-81
9. Low Volume TSP Sampler Calibrations 9-13-81
10. Flow Volumes for the Dichotomous Sampler Data East Helena Lead Study 9-13-81
11. Performance Audit of the East Helena Lead Study Flow Rates Through Samplers 10-5-81
12. East Helena Lead Study Description of Sample Collecting in the Field for the Period October 1, 1981 to December 30, 1981
13. Report of Inspection of the ASARCO Meteorological Monitors - December, 1981
14. Chronology of Site and Equipment Movements

SYSTEM AUDIT OF THE AMBIENT LEAD MONITORING PROJECT OPERATED
IN EAST HELENA BY THE STATE OF MONTANA AIR QUALITY BUREAU

David Weber

Ambient Technology

2/5/81



Introduction:

During January, 1980 a system audit was performed on the ambient lead monitoring program initiated by the State of Montana Air Quality Bureau in the vicinity of East Helena, Montana. This audit had two purposes. First, to document the essential features of the program including site location, construction, operation, analyses, and the flow path of samples and data. The second intention was to compare all aspects of the program with applicable regulations and guidelines, in order to identify any factors that may influence or invalidate the data. The audit focused only upon the ambient air monitoring component of the East Helena study. The following references were used as comparison points against which the site was scrutinized.

- 1) Quality Assurance Handbook for Air Pollution Measurement Systems; vols. 1&2 EPA-600/9-76-005 March, 1976 ; EPA-600/4-77-027a May, 1977
- 2) Air Programs; Ambient Air Quality Monitoring, Data Reporting, and Surveillance Provisions for Lead; Federal Register October 10, 1980
- 3) Methods of Air Sampling and Analysis; M. Katz ed.; APHA Publication
- 4) Code of Federal Regulations; Title 40; Parts 50-59
- 5) Selecting Sites for Monitoring Total Suspended Particulates; EPA-450/3-77-018 December, 1977
- 6) Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates; EPA-600/4-78-047 August, 1978

Organization:

Three separate organizations overlap in the operation of the ambient monitoring program. The primary responsibility for the study rests with the State of Montana Air Quality Bureau (AQB). The addresses and principal

coordinating person are listed below.

David Maughan	James Houck	James Sieverson
State of Montana	NEA Laboratories	ASARCO
Air Quality Bureau	8310 S.W. Nimbus	P.O. Box H
Cogswell Bldg.	Beaverton, Oregon 97005	East Helena, MT. 59635
Helena, Montana 59601	503/643-4661	406/227-5311
406/449-3454		

The functions of the AQB and NEA Laboratories (NEA) have been delineated. The AQB will operate the ambient monitors, perform calibrations, handle and ship samples, assist in data interpretation, and analyze high volume samples for lead content. NEA will be providing low volume samplers, sampling media for the dichotomous and low volume samplers, analyzing these samples, and doing the majority of the data interpretation using chemical mass balance techniques. The role of ASARCO in the project has not, as of Feb, 1981, been explicitly defined. It was proposed that ASARCO provide some assistance in sample collection, analyze high volume samples for lead, interpret data and offer available meteorological data. These items are still under discussion.

Operations:

Three different ambient sampling techniques are used over nine sites. They are the high volume (hi vol), low volume (lo vol), and dichotomous (dicot) methods. Each of these is described below and in the referenced appendix.

High volume sampling -

A complete description of operation, calibration, and sample handling is

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contained in attachments 1-1, 1-6, 1-7, and 1-8. The procedures fulfill the requirements of the Federal Reference Method - high volume sampling. Sample media are S & S glass fiber filters which meet EPA criteria for chemical impurities and collection efficiency. The unexposed media are dessicated for 24 hours prior to weighing on a Mettler H-6 balance maintained by the AQB laboratory. The balance is referenced, every weighing day, to a 5g class S weight traceable to the State of Montana Bureau of Standards (MBS). The scale is serviced annually by "QC Services". The media are exposed for 24 hours (+/-) 15 minutes to a sample flowrate of approximately 40 scfm. Sampling frequency will be every third day, possibly decreasing to every sixth day at some advanced point in the project. A schedule of the sampling days is appended (Attachment 5). The exposed filters are hand carried to the AQB lab where they are again dessicated for 24 hours and reweighed to obtain a total suspended particulate (TSP) determination. The lead content of the filters is assessed by atomic absorption spectrophotometry. Attachments 2-1 and 2-2 comprehensively explain the analytical method and its calibration. Flowrates through the samplers are calibrated with an orifice traceable to a rootsmeter which has been cross-checked with the EPA standard rootsmeter at Denver, Colo. Flow volumes are corrected to standard atmospheric conditions (298 degrees K & 760mm Hg) using the method of reference (6) on the first page of this document. The traceability of the reported data is diagrammed below.

1) Sampler Flowrate:

rootsmeter -> calibrated orifice -> calibration of hi vol pressure transducer

2) TSP weights:

Montana Bureau of Standards -> Class S weight -> Mettler H-6 balance

3) Lead Analyses:

Fisher or Markson 1000ppm metal standards -> Atomic absorption spectrophotometer

Dichotomous Sampler-

The operation and maintenance of the Sierra dichotomous sampler is detailed in attachments 1-4 and 1-5. Sampling media are teflon filters provided by NEA. The filter type has been deliberately chosen for its low background levels of elemental contaminants. Gravimetric analysis is not the significant determination. Thus, calibration of flowrates is noncritical providing the flows are close to the values needed for proper separation of the sample into the two size fractions. The primary quantity measured is the ratio between various indicator elements. Samples are collected for 24 hours +/- 15 minutes on a schedule identical with the high volume sampler. The exposed filters are delivered by Greyhound bus to NEA. Filter handling procedure and shipping containers have been specifically designed to prevent loss of sample through tipping. Analyses will be done on the samples using neutron activation (NAA), see 4-1, and thin film x-ray fluorescence (XRF), see 4-2. The elements that will be surveyed with each technique are listed in attachment 4-3. All filters will be x-ray fluoresced but only selected filters whose XRF shows interesting or significant characteristics will be neutron activated. The flow path of a filter through the analytical process is documented in attachment 4-4. Only half of the filter goes through the analyses while the other half is archived for future reference. Since XRF is nondestructive, the same filter half is available for NAA. Quality assurance samples, indicated in the analytical flow path diagram, are NBS standards. The traceability of the elemental analyses is listed below.

1) NBS standard -> XRF -> reported elemental ratios

The AQB will be calibrating air flowrates using massflowmeters. The calibration technique has been upgraded to reduce pressure influence from the massflowmeter.

2) NBS volume standard -> Hastings bubble tube -> massflowmeter -> rotameter

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Low Volume Sampler -

The low volume sampler is a proprietary device manufactured by NEA. It consists of a teflon sample in a sample holder, covered by a rainhat, through which air is drawn at approximately 30 lpm by a high pressure Gast pump. The flowrate through the sample is determined, before and after the collection period, by measuring the pressure drop on the downstream side of the sample. This pressure drop has been related to a traceable rotameter. Calibration between the pressure drop and the rotameter is to be performed quarterly. Flow volumes are corrected to 298 degrees K and 760 mmHg as per reference (6). Operations, sample handling, and calibration are explained in more detail in attachments 1-2 and 1-3. Analyses duplicate those mentioned above for the dichotomous sampler. The primary reason for using both dichotomous and low volume samplers is that the lo vol offers a complete integrated sample while the dicot gives a size fractionated sample. The flowrate traceability is shown below.

1) Certified Gilmont rotameter -> pressure gauge -> flowrate

The traceability of the analytical data is explained in the dichotomous sampler description.

Quality Assurance-

The project will have a quality assurance program managed by David Weber of Ambient Technology Wilsall, Montana 59086 406/578-2158. The quality control will occur on three levels, system auditing, performance auditing of sampler flowrates together with meteorological monitors, and auditing of the AQB laboratory with "unknown" samples. The system audit is this document and future additions relevant to modifications in the system. The performance audit of the flowrates will be single point checks of the flow using an independently traced standard. The wind speed and wind direction will be

assessed for approximate response.

The NEA laboraotry maintain their own quality assurance program in cooperation with the EPA interlaboratory comparison. See attachment 3.

Precision of the high volume data is to be measured by colocation of samplers at the Firehall site in conformance with the requirements of 40CFR58 Appendix A.

The field handling procedure for all three types of filters was observed in early February. Jerry Schneider of the AQB was the operator. Procedures were found to follow, exactly, those described in the attachments to this document.

Meteorological Monitors-

The meteorological network will be system audited if/when ASARCO provides permission. It will be appended to this document as attachment 7.

Field Sites:

The network consists of nine sites. Seven are in the general vicinity of the lead source while two are background stations. A photodocumentary of the stations and equipment is attached as Appendix 6. The word "source" below refers to the main stack of ASARCO East Helena operations. Quadrants are as follows: North = northwest to northeast; East = northeast to southeast; South = southeast to southwest; West = southwest to northwest. Quadrants extend to 100 meters from the site.

A & W Site:

UTM Coordinates = 5159600mN 431100mE zone 12

Altitude = 1186 m

Equipment = high volume sampler

Probe heights and separations = 4.0m above ground

Distance from source = 1.8 km

Bearing of site from source = 63 degrees N

This site is not a primary installation in the network. It is intended to provide supplementary information. The high volume sampler is placed on a trailer with the roofridge oriented N/S.

North quadrant - The area has approximately 50% ground cover consisting of uncut weeds 3-8" high. The soil is sandy loam, fairly well stabilized, and would not be easily airborne. A moderate average daily traffic (ADT) paved road is at 40 m. Road traffic is 25 - 35 mph.

East Quadrant - Ground type is similar to north but having 80% plant cover. A trailer court entrance road is 17 m away.

South Quadrant - Same ground but with 70% coverage. A fenced auto yard is immediately south of the trailer (5m). Activity in the yard is low.

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West quadrant - There is 70% ground cover as before. A moderate ADT paved road is at 120m.

California Site:

UTM Coordinates = 5159200mN 423600mE zone 12

Altitude = 1256m

Equipment = high volume sampler and low volume sampler

Probe heights and separations = hi vol height = 3.4m; lo vol height = 3.7m;

hi vol - lo vol separation = 2.1m

Distance from source = 5.9km

Bearing of site from source = 273 degrees N

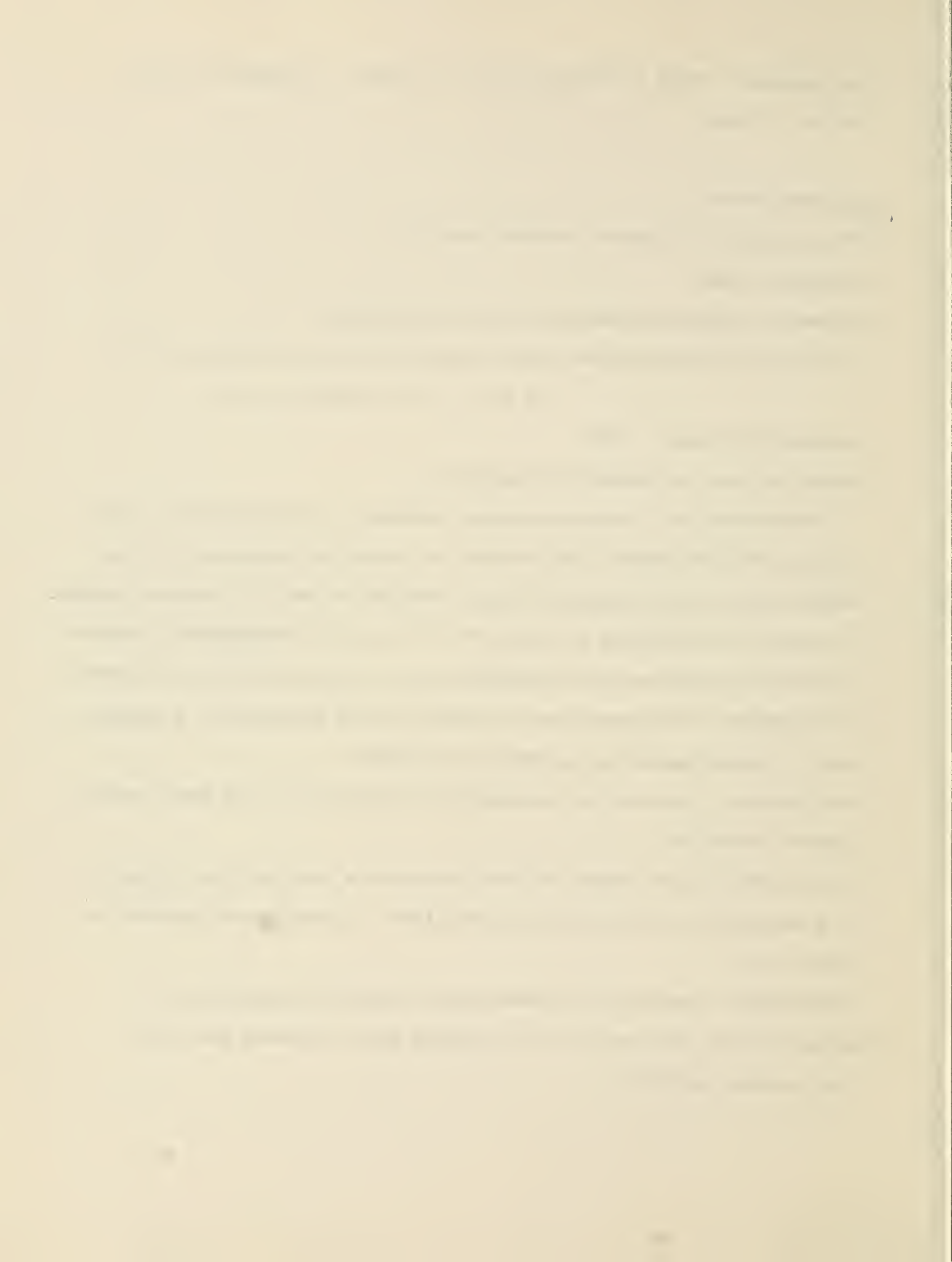
This station is a background monitor situated in the predominantly upwind direction from the source. The monitors are located in conjunction with an ASARCO sulfur dioxide analyzing station. The site is next to a hospital parking lot. The hi vol roofridge is pointed N/S. The site is predominantly downwind from the city of Helena and may experience some contamination from that source.

North quadrant - The ground cover is better than 90% consisting of a planted lawn. A low ADT paved road is 40m from the probes.

East quadrant - This area is also planted with grass out to 13m where there is a paved parking lot.

South quadrant - Lawn extends 9m from the site to a bare plot that drops 10m to a parking lot. The bare spot is rocky loam. It could become airborne in high winds.

West quadrant - Lawn out to 7m where exposed rocky sand extends 5m to a property fence. The sand is of large enough grain to prevent much of it from becoming windborne.



Microwave Site:

UTM Coordinates = 5156200mN 429600mE zone 12

Altitude = 1330m

Equipment = high volume sampler

Probe heights and separations = 3.6m above ground

Distance from source = 2.7km

Bearing of site from source = 175 degrees N

This station sits on a hill overlooking the smelter. It would, most probably, be impacted by plume pollutants. The roofridge on the high volume sampler is directed N/S. This site is also an ASARCO monitoring station.

North quadrant - The ground drops off sharply. Cover is mainly rock. Exposed dirt is slight.

East quadrant - There is sparse ground cover with exposed areas dominated by small broken rocks. Some dust may be picked up when dry and windy.

South quadrant - Groundcover is the same as the east quadrant. At 100m there is a microwave relay station.

West quadrant - The ground cover is better than the south or east (approx. 30 - 50%). The soil is also primarily rocks.

Kleffner Road Site:

UTM Coordinates = 5158000mN 430300mE zone 12

Altitude = 1204m

Equipment = high volume sampler

Probe heights and separations = 3.0m above ground

Distance from source = 1.2km

Bearing of site from source = 135 degrees N

The site is fairly close to the smelter and at the same altitude.

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The high volume sampler roofridge is N/S.

North quadrant - The site is in a powerline right-of-way extending N/S. The ground is densely covered with weeds 6 - 18" high. There is very little exposed soil. Soil is a clay-loam.

East quadrant - Ground cover is the same as north out to 22m where a wheatfield commences. The field is currently stubble and the soil is stabilized. When it is plowed and immediately afterwards, until a new wheat crop holds the soil, the field may prove to be a source of fugitive dust contamination.

South quadrant - Identical to the north quadrant. Southwest of the site, at a distance of 5m, is an ASARCO sulfur dioxide monitoring station.

West quadrant - Ground cover is the same as the north quadrant out to 16.5m where Montana highway 518 is situated. Traffic on the paved road is moderate ADT but high speed (55-65 mph).

Firehall Site:

UTM Coordinates = 5159700mN 429500mE zone 12

Altitude = 1183m

Equipment = two colocated high volume samplers, one dichotomous sampler, and one low volume sampler.

Probe heights and separations = hi vols are 5.7m high, lo vol is 5.9m high,

dichotomous sampler is 5.8m high; hi vol - hi

vol separation = 2.8m, dichotomous - hi vol

separation = 2.0 & 1.8m, lo vol - hi vol

separation = 1.8 & 2.1m, dicot - lo vol = 2.5m

Distance from source = 0.9km

Bearing of site from source = 0 degrees N

This station is a primary data collection point. It has all three

measurement methods at one place as well as colocation of the high volume sampler. It is situated in town at a close range to the smelter where it can be used to assess human impacts. Hi vol roofridges are E/W.

North quadrant - The site is on the roof of a building in central East Helena. The roof measuring 15m by 15m has no sources of particulates. Beyond the roof to the north is a sand and gravel parking lot which may lift some dust when the wind is up and the lot is being trafficked. Two story buildings and a paved city road are at 50m.

East quadrant - There are lawns and houses out to 100m. None of the houses overtop the site. There is a fireplace chimney at about 25m but it shows no soot and probably hasn't been used in recent history.

South quadrant - A paved city street (low ADT) extends for 20m followed by 20m of open sandy dirt. Grain size is large and it would take a substantial wind to make it airborne. Beyond the dirt is a 4 lane highway (US 12) with fairly heavy traffic at 45-55 mph.

West quadrant - 10m away is a paved city street (low ADT) extending 20m to a series of houses and lawns. None of the houses overtop the site.

Canal Site:

UTM Coordinates = 5159200mN 430700mE zone 12

Altitude = 1189m

Equipment = high volume sampler, low volume sampler, dichotomous sampler.

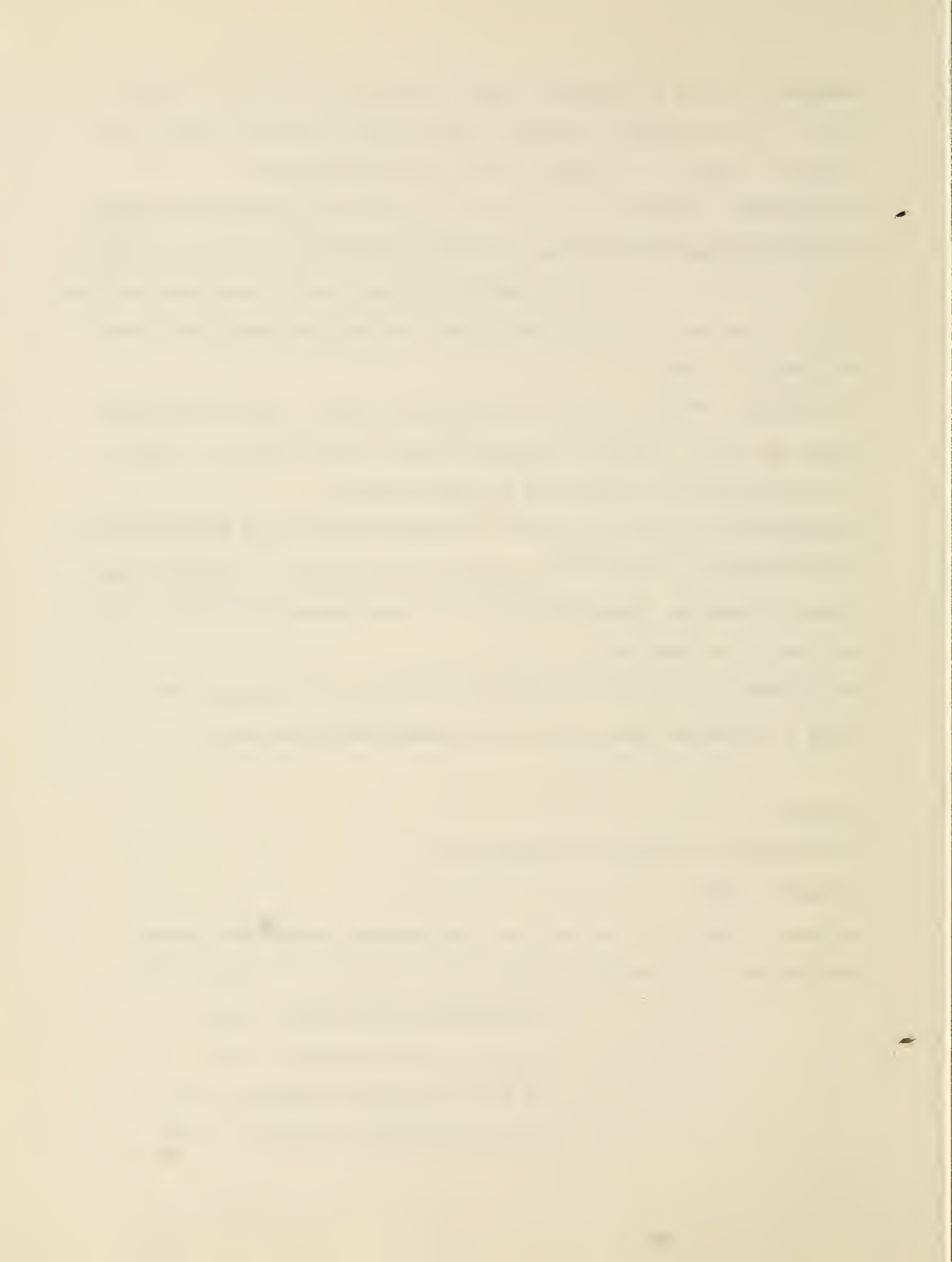
Probe heights and separations = hi vol height = 3.3m, lo vol height = 3.5m,

dichotomous sampler height = 3.4m;

hi vol - lo vol separation = 1.9m

hi vol - dichotomous separation = 1.9m

lo vol - dichotomous separation = 1.3m



Distance from source = 1.3km

Bearing of site from source = 71 degrees N

This station has all three sampling methods and is located close to the source. The hi vol roofridge is N/S.

North quadrant - The ground is about 50% covered with weeds 6-24" high. The soil is principally sand with a small amount of loam. A drainage canal is at 15m, a railroad track at 75m, and a four lane highway (US 12) at 125m. The highway is well trafficked at 45-55 mph.

East quadrant - This area is better covered with vegetation than the other quadrants (approx. 70%). An unused field extends the 100m. A very low ADT dirt road runs east.

South quadrant - The coverage is the same as the north out to 50m where exposed sandy soils lie. They are generally damp (checked late fall and midwinter) and would not be expected to become airborne. During a hot dry summer and a strong wind they may present a problem.

West quadrant - The same as the south except the sandy soils start at 40m.

Vollmer Site:

UTM Coordinates = 5158500mN 432100mE zone 12

Altitude = 1224m

Equipment = high volume sampler and low volume sampler

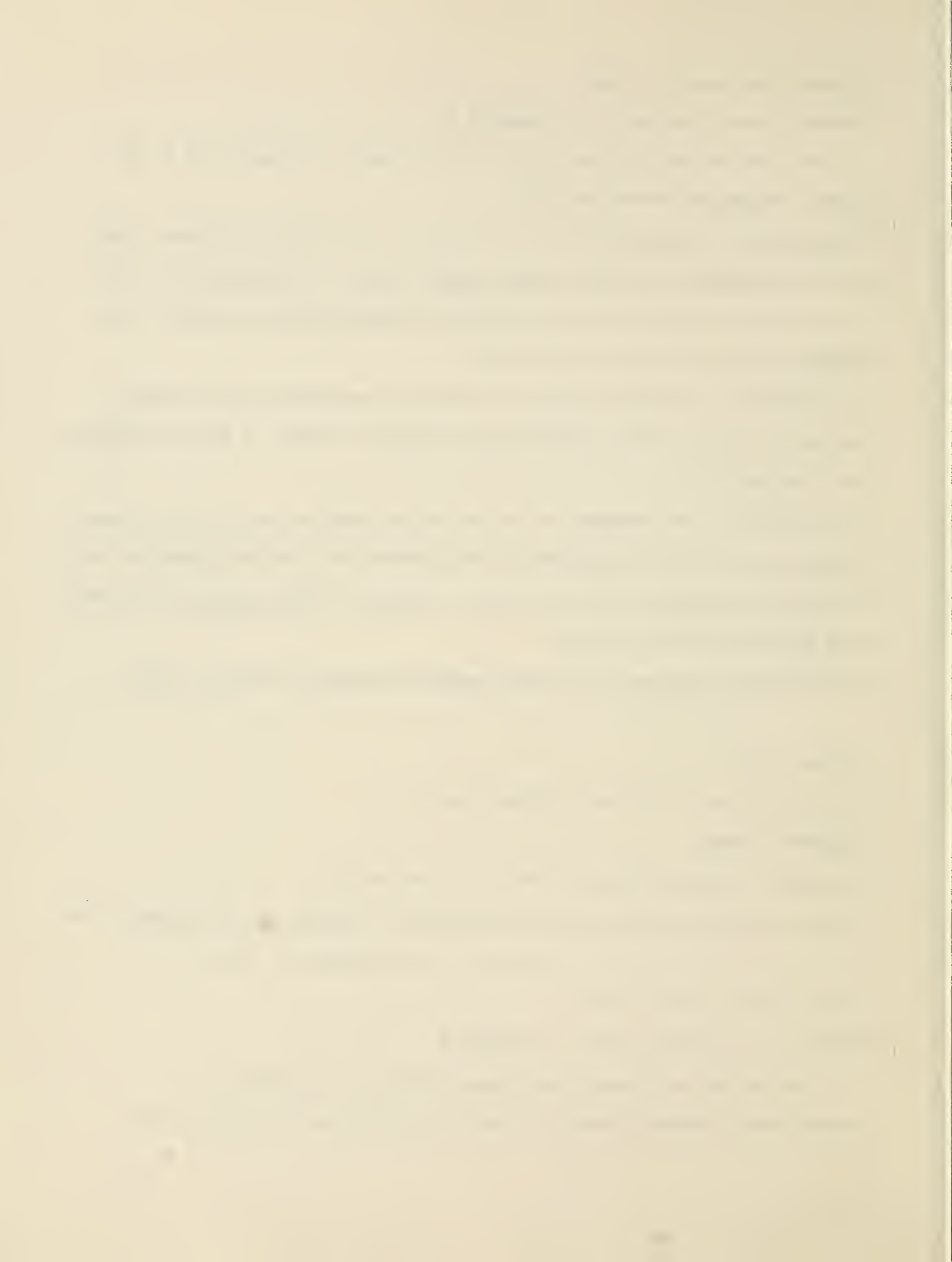
Probe heights and separations = hi vol intake = 3.6m high, lo vol height = 3.6m,

hi vol - lo vol separation = 2.3m

Distance from source = 2.6km

Bearing of site from source = 96 degrees N

This station can assess longer range effects of the source in a predominantly downwind direction. The hi vol roofridge is oriented N/S.



North quadrant - A wheatfield, currently in stubble, extends the full 100m. It will be a dust source during and just after plowing. The soil is rocky loam.

East quadrant - same as north.

South quadrant - Immediately south of the site is the access road. It is dirt with a very low ADT. A fallow field extends 150m to a wheatfield that is currently planted in winter wheat. The fallow field is well (70-80%) vegetated with grasses and weeds. The soil type duplicates north.

West quadrant - The northwest follows the description for north above. The west and southwest follows that explained for south.

Bank Site:

UTM Coordinates = 5152700mN 421800mE zone 12

Altitude = 1173m

Equipment = high volume sampler

Probe height = 5.7m

Distance from source = 3.6km

Bearing of site from source = 297 degrees N

This station is the second background monitoring point. It is in the prevailing upwind direction from the East Helena source. It is located on the roof of a bank building near a busy intersection in northern Helena. The site is operated by the City of Helena in conjunction with the State of Montana Air Quality Bureau. The city does the sample changes while the state does the analyses and calibrations. The hi vol roofridge points north/south.

North quadrant - The area consists of paved parking lots and store fronts out to 100m where there is a busy east/west road with traffic at 25-35 mph. A stoplight is at 100m NNE. Some lead drift from the traffic is to be expected.

East quadrant - There is a paved parking lot out to 50m where Montana Avenue commences. It is a north/south road with heavy traffic at 25-35 mph. Again some lead will be due to automobile traffic.

South quadrant - The area is principally paved parking lots and store fronts.

West quadrant - There is a paved driveway out to 35m where there exists a gravel and dirt lot for a drive-in theatre. Some TSP contamination will be evidenced when it is dry and windy.

Hastie Site:

UTM Coordinates = 5159700mN 429700mE zone 12

Altitude = 1183m

Equipment = high volume sampler

Probe height = 4.4m

Distance from source = 0.9km

Bearing of site from source = 13 degrees north

This site has been operated for some time and is being maintained in the present network for continuity and referencing to the historical data set.

The sampler is on a platform situated in a backyard in East Helena. The hi vol roofridge is oriented north/south.

North quadrant - Immediately north is a shed, the roof of which is below the sampler. Farther to the north is a grassed lawn.

East quadrant - There is a small garden patch of open dirt at 5m. It is well sheltered and would be hard to blow about. The dirt is a loam. The rest of the quadrant is lawn and at 25m, a house.

South quadrant - There is a small strip of open dirt starting at 7m. The dirt description follows that for east. Two large trees at the same height as the sampler are 5m away. They will interfere with proper windflow to the sampler.

West quadrant - Principally lawn with an open dirt garden patch at 20m. The sheltering and dirt description is the same as that for the east quadrant.

11 Feb 81

PERFORMANCE AUDIT OF THE AMBIENT AIR MONITORING NETWORK OF THE
EAST HELENA LEAD STUDY OPERATED BY THE STATE OF MONTANA AIR QUALITY BUREAU

David Weber

Ambient Technology

2/27/81

The first part of the paper discusses the importance of the study of the history of the United States. It is argued that the study of the history of the United States is essential for a full understanding of the country and its people. The second part of the paper discusses the importance of the study of the history of the United States. It is argued that the study of the history of the United States is essential for a full understanding of the country and its people.

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On February 11, 1981 flowrates through the high volume samplers utilized in the ambient air lead study in East Helena, Montana were audited for performance. Jerry Schneider of the State of Montana Air Quality Bureau was present during the audit. Six samplers were checked at a single point with a Sierra calibration orifice. Documentation supporting the traceability of the orifice calibration is attached. Pressure measurements were taken with an aneroid barometer and ambient temperature was assessed with a Taylor thermometer. Corrections to standard atmospheric conditions were made using the method described in the document "Investigation of Flow Rate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates", EPA-600/4-78-047.

Another audit was done on a dichotomous sampler maintained at the Firehall Site. Preliminary results demonstrated large errors. This prompted a more thorough investigation which has been described in the report entitled "Investigation of Calibration Techniques for the Dichotomous Sampler", David Weber.

High Volume Sampler audit results:

	Station Value	Audit Value	% Difference
Firehall Site (colocated) ⁻⁰² _{NE}	34.2 scfm	36.2 scfm	-5.4% 6.5
Firehall Site (reporting)	36.8	38.1	-3.5
A & W Site	33.5	35.4	-5.5
Canal Site	38.4	37.3	+3.8
Vollmer Site	39.1	37.3	+5.6
Montana City Site	34.5	35.6	-3.1

As can be seen, all results are within the 10% acceptance criterion.

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TRACEABILITY OF STANDARDS USED IN THE AUDITING OF
HIGH VOLUME SAMPLERS FOR FLOWRATE (Feb, 1981)

High volume samplers are audited at a single point, through one clean filter, using a Sierra calibration orifice and a water manometer. The orifice was calibrated with a rootsmeter maintained by the State of Montana Air Quality Bureau in Helena. This rootsmeter has been correlated with another rootsmeter owned by the Environmental Protection Agency Region 8 in Denver, Colorado. The Montana meter was found to read about 1.3% higher than the EPA meter. The EPA meter has been traced to the NBS. Calibration procedures and audit calculations follow those described in "Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates" EPA-600/4-78-047 and adopted by EPA Region 8 in their document "EPA Region VIII Policy on Correcting Total Suspended Particulate Data to Reference Condition, 1979." Ambient pressure during the audit was measured with an aneroid barometer checked against a mercury barometer. The ambient temperature was determined with a Taylor thermometer that was calibrated with an ASTM 64C thermometer standard.

Calibration Check on the Aneroid Barometer; S/N SDHES 0633 7012.

Aneroid = 654.3 mm Hg Mercurial = 655.2 mm Hg % Difference = -0.1%

Calibration of the Field Thermometer; Taylor #21412-2.

Referenced to an ASTM 64C certified thermometer.

by a linear regression on 6 data points:

Temperature (degrees C) = 0.5490 (reading in degrees F) - 17.4

Correlation Coefficient = 0.9998

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J. B. BENTLEY, 10 NASSAU ST.
1857.

Calibration of the Audit Orifice

The orifice was referenced to a General Metal Works Rootsmeter S/V 7379716.

Ambient Pressure during the calibration = 653.3 mm Hg

Ambient Temperature = 296.3 degrees K

for 7 data points a ln-ln transformed linear regression gives:

$$Q \text{ (theoretical) scfm} = 17.054 (\text{orifice vacuum in inches water})^{0.4963}$$

$$\text{Correlation coefficient} = 0.9999$$

During the audit, this correction is used:

$$Q \text{ (std) scfm} = Q \text{ (theoretical) } \sqrt{(P/760)(298/T)}$$

where: P = audit pressure T = audit temperature

Calibration Data:

Q theoretical	Orifice Vacuum
20.94 scfm	1.5 inches water
26.71	2.5
32.57	3.7
37.97	5.0
42.88	6.35
46.68	7.55
48.79	8.4

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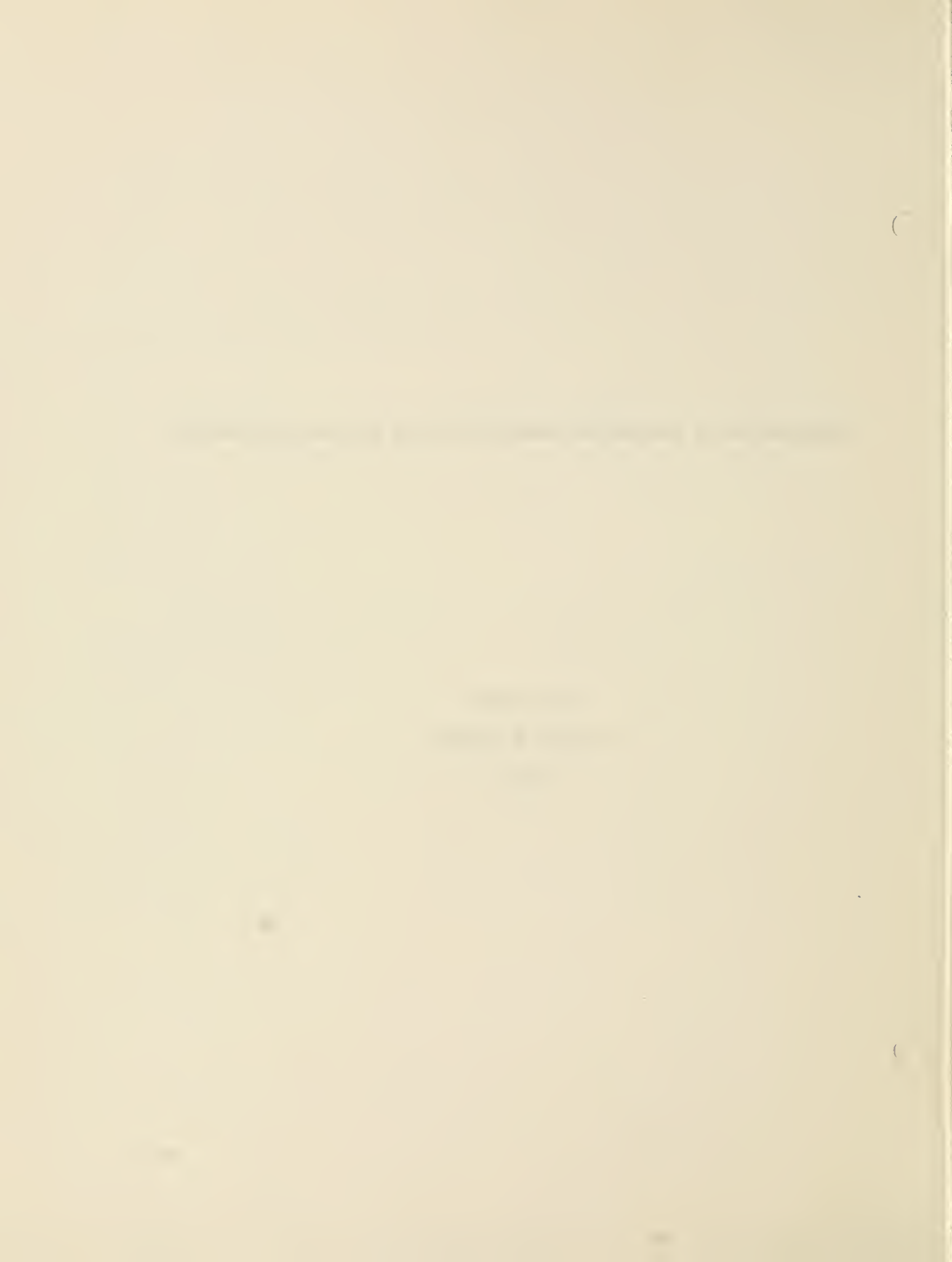
1907

INVESTIGATION OF CALIBRATION TECHNIQUES FOR THE NEA LOW VOLUME SAMPLER

David Weber

Ambient Technology

4/22/81



On March 31, 1981 a field performance audit of an NEA low volume sampler located at the Fire Station Site of the East Helena Lead Study demonstrated varying results which depended on how the audit device (a massflowmeter) was configured into the flow system of the sampler. This prompted, on April 14, 1981, an investigation into calibration and audit procedures for the low volume technique. The intent of the study was to:

- 1) Determine if the historical calibration method was in error and to document the extent and variability of the error.
- 2) If the calibration error exceeded the acceptance criterion of 10% then to develop an alternate calibration technique.
- 3) Establish a convenient and reproducible field audit method.

The results of the study are given below. The calibration traceability of all reference materials is appended to this report (1-1).

Experimental:

The historical calibration method used a Gilmont high volume rotometer. The filter and holder were removed from the intake of a sampler and the rotometer was installed in their place (See the flow diagram in appendix 1-2). The sampler was turned on and allowed to stabilize. The readings on a vacuum gauge situated between the intake and the pump were referenced to the values measured on the flowmeter. Thus, the gauge was calibrated with the rotometer. The flow values were corrected to standard atmospheric conditions (298 degrees K and 760 mmHg) using the factor for flow through an orifice, $C = \text{SQRT}((P \times 298) / (760 \times T))$. A more detailed explanation of the calibration is included in this report as appendix 1-3.

When the sampler is used in the field, flows are measured with the vacuum gauge at the beginning and the end of a sample run. These values are averaged and converted to a typical flow using the previously obtained calibration data.

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LIFE OF THE LATE KING CHARLES THE FIRST
BY JOHN BURNET
IN TWO VOLUMES
THE SECOND PART

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THE SECOND PART

Preliminary attempts to audit the sampler used a massflowmeter attached the first time to the intake and the second time between the second valve and the pump. This produced widely varying results of a dubious value. The reason for this effect was the extreme flow constriction imposed by the orifice in the mass flowmeter. Since the field audit results were contrary, two samplers were pulled from the field and brought to the laboratory where they could be rigorously studied. The flow was investigated with a rootsmeter which is considered a primary standard for flow measurement. The State of Montana Air Quality Bureau rootsmeter has been cross-checked with the EPA Region 8 rootsmeter and found to be in close agreement (See 1-1). The oiling mechanism for the sample pumps was temporarily disconnected and the rootsmeter was attached to the sample exhaust. The sampler was configured in the normal sampling mode with a filter installed. The sampler was started and allowed stabilize. The vacuum gauge reading was recorded and rootsmeter flow measurement initiated. Ambient pressure and temperature during the test were measured with a mercurial barometer and a precision thermometer. The timebase for the rootsmeter was an electronic stopwatch with a ± 100 ppm crystal that has been referenced to WWV. After a sufficient flow volume, the rootsmeter was disconnected and the sampler was configured in the calibration mode. The needle valve on the rotometer was adjusted until the vacuum gauge read the same as that recorded with the rootsmeter measurement. The rotometer reading was obtained and converted to standard atmospheric conditions. The two values, rotometer and rootsmeter, were compared. The process was repeated for the second sampler.

Results:

Sampler #1 with a common vacuum reading of 8.3 had a rotometer flowrate of 26.7 slpm and a rootsmeter value of 25.4 slpm.

Sampler #2 with a common vacuum reading of 4.7 had a rotometer flowrate of 24.1 slpm and a rootsmeter value of 23.4 slpm.

Discussion:

The relative % error on sampler #1 with the rootsmeter as the reference was +5.1%. The relative error on #2 was +3.0%.

As can be seen the error is within the 10% acceptance criterion. The rotometer flows are consistently biased on the high side but the margin is small. What this indicates is that the flow restriction of the rotometer at the sampling flowrate is similar to the restriction imposed by the filter. However, auditing with a massflowmeter, even a large volume one (0-200slpm), produces erroneous results because of the much greater flow restriction and cannot be recommended. Field auditing with rootsmeter is impractical. Therefore, the audit method will have to be the same as the calibration technique. This is not a pure audit because the audited configuration is not the same as the sampling configuration but, as this document shows, the induced error is not significant for most applications. The variability between samplers is also insignificant.

Conclusion:

The historical data set obtained from the low volume sampler does not contain significant artifacts introduced by the calibration method. The established calibration technique should continue to be utilized. Field audit techniques will need modification from the massflowmeter to a rotometer. It is recommended that the Gilmont rotometer be independently calibrated with the rootsmeter and that calibration used for audit purposes. Audit measurements must include ambient pressure and temperature readings obtained at the audit location and calculations will require the application of the orifice correction factor.

Correlation between the Rootsmeter airflow standard at EPA Region 8
with the Rootsmeter airflow standard at the Montana Air Quality Bureau.

EPA Calibration

$Y=0.5214 X 0.4988$
 $R=0.99989$

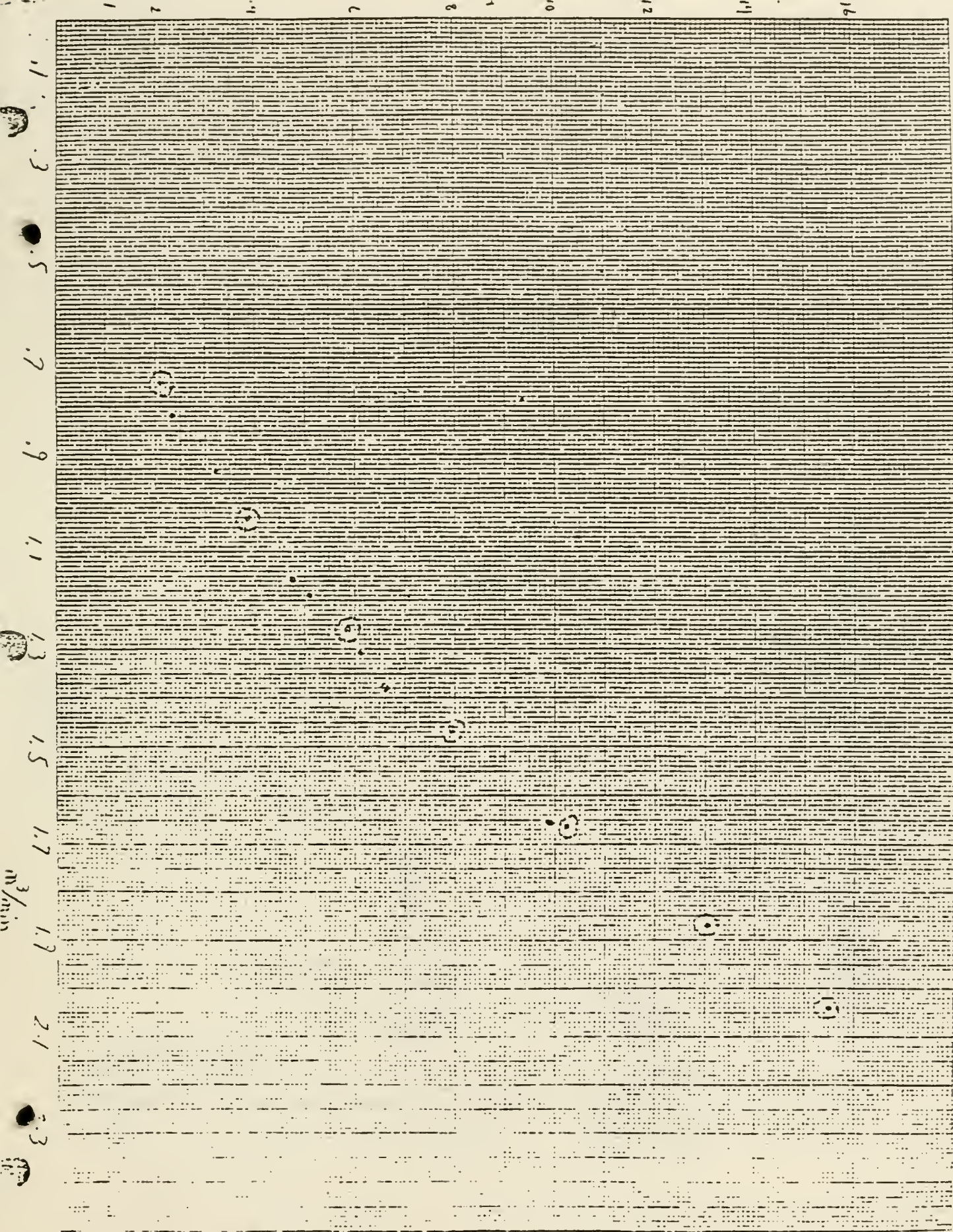
Montana Calibration

$Y=0.5297 X 0.4999$
 $R=0.9995$

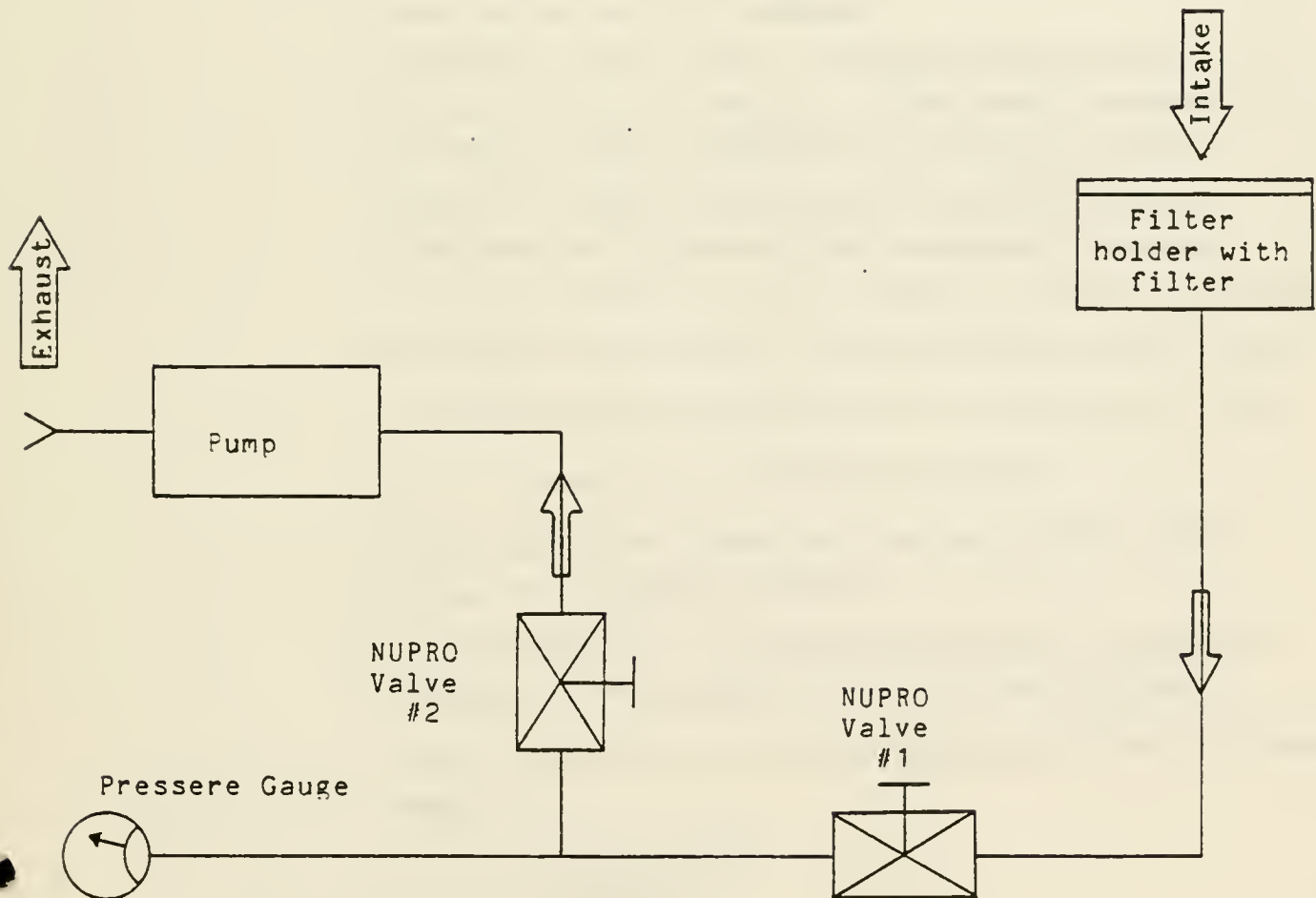
<u>Manometer</u>	<u>M³/Min</u>	<u>M³/Min</u>	<u>Difference, %</u>
2	0.7368	0.7491	1.7
4	1.0411	1.0593	1.7
6	1.2744	1.2973	1.8
8	1.4711	1.4979	1.8
10	1.6443	1.6746	1.8
12	1.8008	1.8344	1.9
14	1.9447	1.9914	1.9

A General Metal Works high volume sampler orifice
was used as the transfer standard.

DEPA.M



FLOW DIAGRAM FOR THE NEA
LOW VOLUME SAMPLER



STANDARD OPERATING PROCEDURE

NEA LOW-VOLUME TSP SAMPLER CALIBRATION

- A. Calibration is required initially and after any vacuum system component repair or replacement, or if an audit shows an error of $> \pm 7\%$ flow rate. The flow meter used for calibration is traceable to an NBS standard.
- B. Lo-Vol TSP Sampler Calibration:
1. Install flow calibration needle valve and flow meter.
Turn needle valve fully counter clockwise.
 2. Switch sampler on and let sampler warm up for a few minutes.
 3. Record date, initials, sampler serial number, flow meter serial number, temperature and pressure.
 4. Install sampler vacuum gauge.
 5. Record vacuum and flow readings.
 6. Repeat Step 4 for at least five calibration needle valve settings that give a range of vacuum readings between 0 and 25" Hg. (As an alternative to the needle valve apparatus, a rubber stopper filter head adapter and a filter head with different flow resistance filters may be used.) After at least five calibration points are obtained with needle valve assembly, the needle valve assembly should be replaced with the unobstructed tube assembly for a high flow (low pressure drop) calibration point.
 7. Switch sampler off, remove calibration equipment, and replace vacuum gauge port plug.
 8. Find corresponding flow rates from flow meter readings and calibration chart supplied by flow meter manufacturer.
 9. Correct flow rates to standard conditions with the following formula:

$$Q_1 = Q_2 \left[\frac{P_2 T_1}{P_1 T_2} \right]^{1/2}$$

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From the first settlement of the
English in 1630 to the present time
the city of Boston has been the seat of
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center of the Puritan movement,
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Q_1 = Flow rate corrected to STP

Q_2 = Measured flow rate

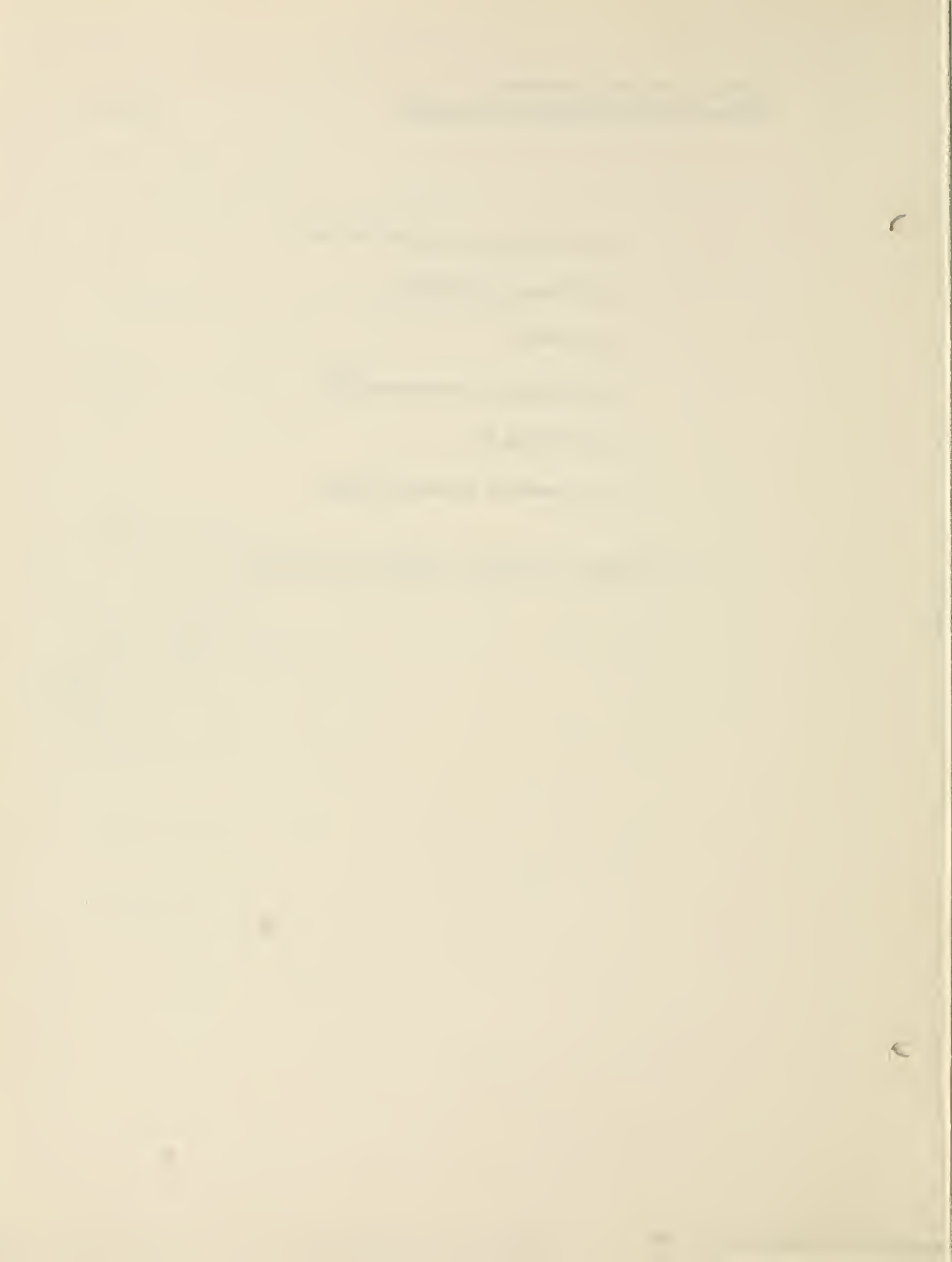
T_1 = 298°K

T_2 = Measured temperature (°K)

P_1 = 760. mm Hg

P_2 = Measured pressure (mm Hg)

10. Construct a graph of vacuum vs. flow rate.



CALIBRATION CHART

Gilmont Flowmeter - Catalog No. F 1500 - Serial No. E-3903

<u>Reading Center of Ball</u>	<u>Flow Rate (LMP)</u>	<u>Reading Center of Ball</u>	<u>Flow Rate (LMP)</u>	<u>Reading Center of Ball</u>	<u>Flow Rate (LMP)</u>
1		34	25.9	67	54.8
2		35	26.9	68	55.7
3		36	27.8	69	56.6
4		37	28.7	70	57.5
5		38	29.5	71	58.4
6		39	30.3	72	59.3
7		40	31.1	73	60.2
8		41	32.0	74	61.1
9	6.8	42	33.0	75	61.9
10	7.6	43	33.9	76	62.6
11	8.2	44	34.8	77	63.5
12	9.0	45	35.5	78	64.4
13	9.8	46	36.3	79	65.2
14	10.5	47	37.2	80	66.1
15	11.2	48	38.0	81	67.1
16	12.0	49	39.0	82	68.0
17	12.8	50	40.0	83	68.8
18	13.5	51	40.9	84	69.7
19	14.2	52	41.8	85	70.4
20	15.0	53	42.5	86	71.2
21	15.8	54	43.2	87	72.1
22	16.5	55	44.2	88	72.9
23	17.2	56	45.0	89	73.9
24	18.0	57	46.0	90	74.8
25	18.7	58	46.9	91	
26	19.5	59	47.8	92	
27	20.3	60	48.7	93	
28	21.1	61	49.5	94	
29	21.8	62	50.2	95	
30	22.7	63	51.1	96	
31	23.6	64	52.0	97	
32	24.3	65	52.9	98	
33	25.0	66	53.9	99	
				100	

LOW-VOLUME CALIBRATION DATA

Sampler Serial No. _____

Date _____

Initial _____

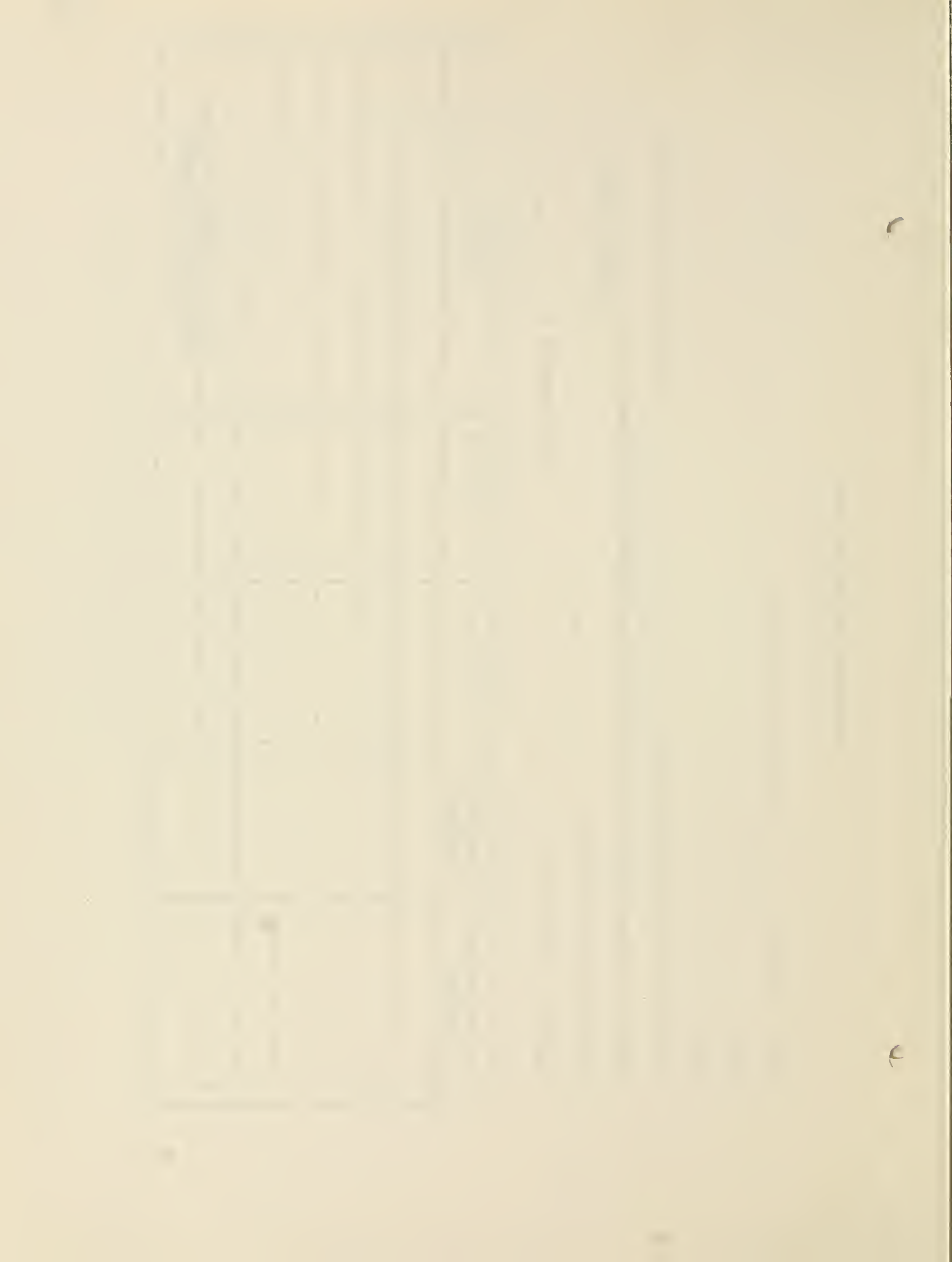
Barometric Pressure (specify units) _____ (Corrected to Sea Level?)

Elevation difference between calibration site and barometric measurement site _____
(specify units)

Barometric Pressure (in Hg) _____

Temperature (specify units) _____ = Temperature ($^{\circ}$ K) _____

Vacuum Reading (in Hg)	Flow Meter Reading	Flow lpm	Flow slpm	Comments
1.				
2.				
3.				
4.				
5.				
6.				HI-flow data point from un- obstructed tube assembly.



14 Apr. 81

PERFORMANCE AUDIT OF THE EAST HELENA LEAD STUDY:

FLOWRATES THROUGH SAMPLERS;

LABORATORY UNKNOWNNS

David Weber

Ambient Technology

4/27/81

FLOWRATES THROUGH AMBIENT AIR SAMPLERS

On April 14, 1981 a selected portion of the high volume and dichotomous samplers maintained in the East Helena Lead Study were audited for flowrate calibration. Documentation supporting the traceability of the audit standards is attached. Initial audit measurements of an NEA low volume sampler produced varying results dependent upon the audit configuration. This prompted a more thorough investigation of the NEA sampler which has been described in the report entitled "Investigation of Calibration Techniques for the NEA Low Volume Sampler."

High Volume Sampler:

	Station Value	Audit Value	% Difference
Hastie Site	38.9 scfm	37.1 scfm	+4.9%
Vollmer Site	37.4	36.5	+2.5
Bank Site	42.3	39.1	+8.2

Dichotomous Sampler:

	Station Value	Audit Value	% Difference
Firehall Site Fines	15.88 slpm	15.58 slpm	+1.9%
Firehall Site Coarse	1.82 slpm	1.59 slpm	+14.5%

The only value exceeding the 10% acceptance criterion is the Coarse Particulate calibration on the Firehall Site dichotomous sampler. It is recommended that this parameter be recalibrated.

THE HISTORY OF THE

REIGN OF THE EMPEROR OF THE EAST

FROM THE DEATH OF THE EMPEROR OF THE WEST

TO THE PRESENT TIME. IN THREE VOLUMES. VOL. I. THE HISTORY OF THE REIGN OF THE EMPEROR OF THE EAST, FROM THE DEATH OF THE EMPEROR OF THE WEST, TO THE PRESENT TIME. IN THREE VOLUMES. VOL. I.

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TRACEABILITY OF STANDARDS USED IN THE AUDITING OF
HIGH VOLUME SAMPLERS FOR FLOWRATE (Feb, 1981)

High volume samplers are audited at a single point, through one clean filter, using a Sierra calibration orifice and a water manometer. The orifice was calibrated with a rootsmeter maintained by the State of Montana Air Quality Bureau in Helena. This rootsmeter has been correlated with another rootsmeter owned by the Environmental Protection Agency Region 8 in Denver, Colorado. The Montana meter was found to read about 1.8% higher than the EPA meter. The EPA meter has been traced to the NBS. Calibration procedures and audit calculations follow those described in "Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates" EPA-600/4-78-047 and adopted by EPA Region 8 in their document "EPA Region VIII Policy on Correcting Total Suspended Particulate Data to Reference Condition, 1979." Ambient pressure during the audit was measured with an aneroid barometer that was referenced to a mercury barometer. The ambient temperature was determined with a Taylor thermometer that was calibrated with an ASTM 64C thermometer standard.

Calibration Check on the Aneroid Barometer; S/N SDHES 0633 7012

Aneroid = 654.3 mmHg Mercurial = 655.2 mmHg % Difference = -0.1%

Calibration of the Field Thermometer; Taylor #21412-2

Referenced to an ASTM 64C certified thermometer.

by a linear regression on 6 data points:

Temperature (degrees C) = $0.5490 (\text{reading in degrees F}) - 17.4$

Correlation Coefficient = 0.9998

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abolition of slavery. It has been
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men of letters and science, and
the seat of the most important
educational institutions of the
country. It has been the center of
the most important commercial
activity of the New England
region, and the seat of the most
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Calibration of the Audit Orifice

The orifice was referenced to a General Metal Works Rootsmeter S/N 7379716.

Ambient Pressure during the calibration = 653.3 mmHg

Ambient Temperature = 296.3 degrees K

for 7 data points a ln-ln transformed linear regression gives:

$$Q \text{ (theoretical) scfm} = 17.054 \text{ (orifice vacuum in inches water)} ^{0.4963}$$

$$\text{Correlation Coefficient} = 0.9999$$

During the audit the flows are corrected to SAC using:

$$Q \text{ (std) scfm} = Q \text{ (theoretical) } \sqrt{[(P/760)(298/T)]}$$

where: P = audit pressure (mmHg) T = audit temperature (degrees Kelvin)

Calibration Data

Q theoretical	Orifice Vacuum
20.94 scfm	1.5 inches water
26.71	2.5
32.57	3.7
37.97	5.0
42.88	6.35
46.68	7.55
48.79	8.4

STANDARDS USED IN AUDITING DICHOTOMOUS SAMPLERS FOR FLOWRATE

The dichotomous sampler is audited for flowrate on the "coarse" and "fine" particulate channels using massflowmeters. The method for connecting the massflowmeters into the sampler plumbing is explained in the document "Investigation of Calibration Techniques for the Dichotomous Sampler", D. Weber 1981. The actual measured parameters are coarse and total flow. The fine flow is determined by $(\text{fine}) = (\text{total}) - (\text{coarse})$. The audit of each channel occurs at a single flowpoint representing the normal sample flow (ie. 1.67 on the coarse rotometer and 16.7 on the total rotometer).

Calibration of the Massflowmeters

Two massflowmeters, Tylan 0-5 standard liters per minute (slpm) S/N 8023025 and 0-20 slpm S/N 8073007 were calibrated with a Hastings bubble flowmeter that is traceable to an NBS volume standard. A linear regression equation is generated for each flowmeter.

0-5 slpm:

Flow at 298 degrees K and 760 mmHg in slpm = $4.771 (\text{massflowmeter volts}) + 0.103$

Correlation Coefficient = 0.9999 over 8 points

0-20 slpm:

Flow at 298 degrees K and 760 mmHg in slpm = $2.194 (\text{massflowmeter volts}) + 0.083$

Correlation Coefficient = 0.9998 over 6 points

Ambient Pressure during the calibration was measured with an aneroid barometer that was referenced to a mercurial barometer. Aneroid=654.3mmHg Mercury=655.2
Ambient temperature was measured with a Taylor thermometer that has been calibrated with an ASTM 64C standard.

The time base was an electronic stopwatch with a $\pm 100\text{ppm}$ crystal that has been checked with WWV transmissions.

RESULTS OF THE LABORATORY QUALITY CONTROL SAMPLES

Weight Unknown:

	Audit Value	Lab Value	% Difference
Unknown #1	6.3074 g	6.3074 g	0.0%

Lead Unknown:

	Audit Value	Lab Value	% Difference
Unknown #7	38.8 ug Pb	40.6 ug Pb	+4.6%

The results are well within any expected error.

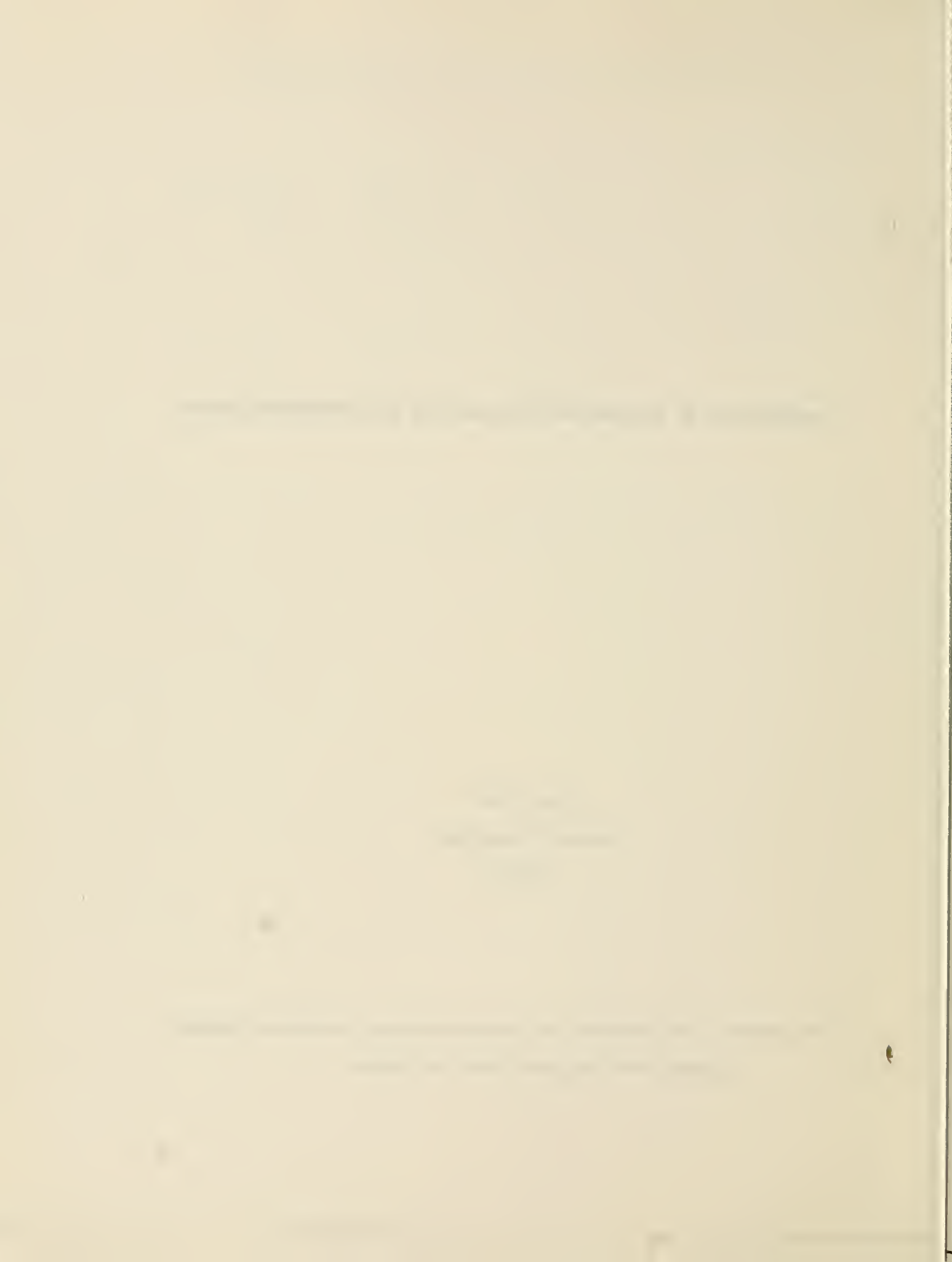
INVESTIGATION OF CALIBRATION TECHNIQUES FOR THE DICHOTOMOUS SAMPLER

David Weber

Ambient Technology

4/27/81

This report is an expansion and clarification of an earlier document
released under the same title on 2/27/81.



On February 11, 1981 an audit of flowrates through a Sierra Dichotomous sampler operated by the State of Montana Air Quality Bureau in the East Helena Lead Study revealed large discrepancies in measured values depending upon how the audit device, a massflowmeter, was configured into the plumbing of the sampler. This prompted, on February 18, 1981, a detailed investigation into the causes of the discrepancies. The investigation had three primary functions:

- 1) Determine if the historical method of calibration was in error and document the source(s) and extent of the error.
- 2) If the error exceeds 10% then devise an alternate calibration scheme.
- 3) Define how the error effects the historical data base.

Experimental:

The experiment consisted of pulling two Sierra dichotomous samplers from field sites and setting them up in a laboratory environment where they could be rigorously studied. First, the calibrators were configured to the historical calibration scheme and all flow related parameters were assessed. This defined the historical calibration method and thereby the traceability of values in the historical data base. Second, various measurement configurations were explored until one was found that had the necessary elements of a calibration scheme that mimicked the sampling scheme and demonstrated no influence due to the calibration instruments. This new scheme was studied in detail and then a comparison was drawn with the historical scheme. All flow measurements were made with either a 0-5 or 0-20 standard liter per minute (slpm) Tylan massflowmeter. Calibration traceability of these devices is appended to this report. Descriptions referring to various flow connections are directed to the flow diagram attached to this report. This diagram has been extracted from the operation manual for the Sierra dichotomous sampler.

On April 14, 1981 a third dichotomous sampler was investigated in order to clarify sampler to sampler variations in error. That data is included in the results section.

The Historical Calibration Scheme -

Previous to this report the Air Quality Bureau has calibrated dichotomous samplers in the field by attaching two massflowmeters to the coarse and fine sampler inlets (Qc and Qf on the diagram) on the side of the instrument box. The sampler was turned on and the flow was allowed to steady. The total rotometer (1 cmh flowmeter on diagram) and the coarse rotometer (0.1 cmh) were calibrated over their ranges using the values read from the massflowmeters. Since massflowmeters always read at standard atmospheric conditions no correction factors were necessary. The massflowmeters were referenced to a bubbleflowmeter which is considered a primary standard. Normally the total rotometer operates at a reading of 16.7 during a sample run. The corresponding value for the coarse rotometer is 1.67. During the particulate calculations the coarse rotometer calibration supplies the flowrate for the coarse particulates and the difference between the total and coarse rotometer calibration supplies the flow value for the fine particulates.

New Calibration Scheme -

It was realized that rotometer readings are sensitive to their pressure/temperature environment. Thus, in the new calibration scheme the massflowmeters were configured into the dichotomous sampler in such a way as to eliminate effects due to their presence. The sampling head was not disconnected from the instrument box as was necessary during the historical calibration method. This made the calibration process identical with the sampling process. One massflowmeter was inserted in the system at point A in the diagram. This point was chosen because it is inside the pressure compensation loop controlled by a regulator (labelled as flow controller in the schematic). Therefore, any

pressure effects introduced by the massflowmeter would be automatically compensated. Since no flow occurs through line C (it is a pressure sensor) the values read by the massflowmeter at A would be identical to the values on the total rotometer (1 cmh). A second massflowmeter was inserted at B. This is on the compensated side of the coarse rotometer (0.1 cmh) and does not contribute to pressure errors. Since this method has the sampling head attached, an additional study was undertaken to determine the effect of varying the lengths of tubing between the sample head and the instrument box.

Results:

Comparison of Historical and New Calibration Schemes-

Comparisons were made with the rotometers held constant at typical sample values

Coarse Flow-	Historical	New	% Difference
Sampler #1	1.52 slpm	1.51 slpm	+0.7%
Sampler #2	1.52	1.52	0.0

Fine Flow-	Historical	New	% Difference
Sampler #1	9.17 slpm	15.18 slpm	-39.6%
Sampler #2	13.88	15.89	-12.6
Sampler #3	13.91	15.75	-11.7

Difference Due to Varying Lengths of Interconnecting Sample Lines-

	11' of line	26' of line	% Difference
Coarse Flow	1.53 slpm	1.52 slpm	0.7%
Fine Flow	15.91	15.89	0.2

The first part of the paper discusses the importance of the study and the objectives of the research. It also provides a brief overview of the methodology used in the study. The second part of the paper presents the results of the study and discusses the implications of the findings. The third part of the paper concludes the study and provides some suggestions for future research.

The study was conducted in a laboratory setting and involved the use of a series of tests to measure the performance of the system. The results of the study show that the system is capable of performing the required tasks and that the performance is consistent across the different tests.

Test	Result	Standard Deviation	Significance Level
Test 1	1.2	0.1	0.05
Test 2	1.5	0.2	0.01
Test 3	1.8	0.3	0.001
Test 4	2.1	0.4	0.0001
Test 5	2.4	0.5	0.00001

The results of the study show that the system is capable of performing the required tasks and that the performance is consistent across the different tests. The study also shows that the system is capable of performing the required tasks and that the performance is consistent across the different tests.

Discussion:

Average error of the "coarse" calibration = +0.4%

Average error of the "fines" calibration = -21.3%

The coarse particulate calibration and, therefore, the coarse data base shows very little error in the historical calibration method. Thus, the extra bother of configuring the system for the new method calibration of the coarse rotometer is not justified and continuance of the historical calibration scheme is recommended for this parameter.

The fines calibrated flows demonstrate a substantial error in the historical method. This error is greater than what would be theoretically expected (rotometers vary as the square root of pressure). This is because pressure effects on the fines side induced by flow constriction through the massflowmeter are accentuated by the pressure regulator. The coarse rotometer does not exhibit this error because the coarse side flowrates and therefore the flow constriction are an order of magnitude less. Further support for the conclusions of the new calibration method is obtained when the altitude corrected rotometer readings are compared to the two methods. The readings closely follow the new method. A further disturbing fact is apparent in the results. The "fines" error varies significantly between different samplers. Thus, errors in the dichotomous sampler fine particulate data base are not simply correctable by a constant factor. The new calibration method for the total flow rotometer should be adopted. This can be done by bringing the sample line at point A out to a loop in the front panel of the instrument. A massflowmeter can be inserted in the loop when calibrating. The quality assurance manual for the dichotomous sampler should be revised to explain these modifications to the calibration technique.

The variability in the data introduced by changing the sample lines by

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a length of 15' is less than 1% and is, therefore, negligible.

Conclusions:

- 1) The "coarse" particulate historical calibration technique for the dichotomous sampler is not in significant error.
- 2) The "coarse" particulate data base for the dichotomous sampler does not contain significant artifacts due to the calibration process.
- 3) The dichotomous sampler "fines" particulate historical calibration scheme is not valid and should be terminated.
- 4) The dichotomous sampler "fines" particulate data base has errors exceeding 10%. The reported particle values are too high. The data base is not simply correctable because of the error variability between different samplers.
- 5) A new calibration method has been proposed for the total flow rotometer (and thereby the "fines"). It is explained in the discussion section of this report.
- 6) Varying the lengths of sample line connecting the sample head to the instrument box will not significantly influence the calibration.

STANDARDS USED IN AUDITING DICHOTOMOUS SAMPLERS FOR FLOWRATE

The dichotomous sampler is audited for flowrate on the "coarse" and "fine" particulate channels using massflowmeters. The method for connecting the massflowmeters into the sampler plumbing is explained in the document "Investigation of Calibration Techniques for the Dichotomous Sampler", D. Weber 1981. The actual measured parameters are coarse and total flow. The fine flow is determined by $(\text{fine}) = (\text{total}) - (\text{coarse})$. The audit of each channel occurs at a single flowpoint representing the normal sample flow (ie. 1.67 on the coarse rotometer and 16.7 on the total rotometer).

Calibration of the Massflowmeters

Two massflowmeters, Tylan 0-5 standard liters per minute (slpm) S/N 8023025 and 0-20 slpm S/N 8073007 were calibrated with a Hastings bubble flowmeter that is traceable to an NBS volume standard. A linear regression equation is generated for each flowmeter.

0-5 slpm:

Flow at 298 degrees K and 760 mmHg in slpm = $4.771 (\text{massflowmeter volts}) + 0.103$

Correlation Coefficient = 0.9999 over 8 points

0-20 slpm:

Flow at 298 degrees K and 760 mmHg in slpm = $2.194 (\text{massflowmeter volts}) + 0.083$

Correlation Coefficient = 0.9998 over 6 points

Ambient Pressure during the calibration was measured with an aneroid barometer that was referenced to a mercurial barometer. Aneroid=654.3mmHg Mercury=655.2
Ambient temperature was measured with a Taylor thermometer that has been calibrated with an ASTM 64C standard.

The time base was an electronic stopwatch with a $\pm 100\text{ppm}$ crystal that has been checked with WWV transmissions.

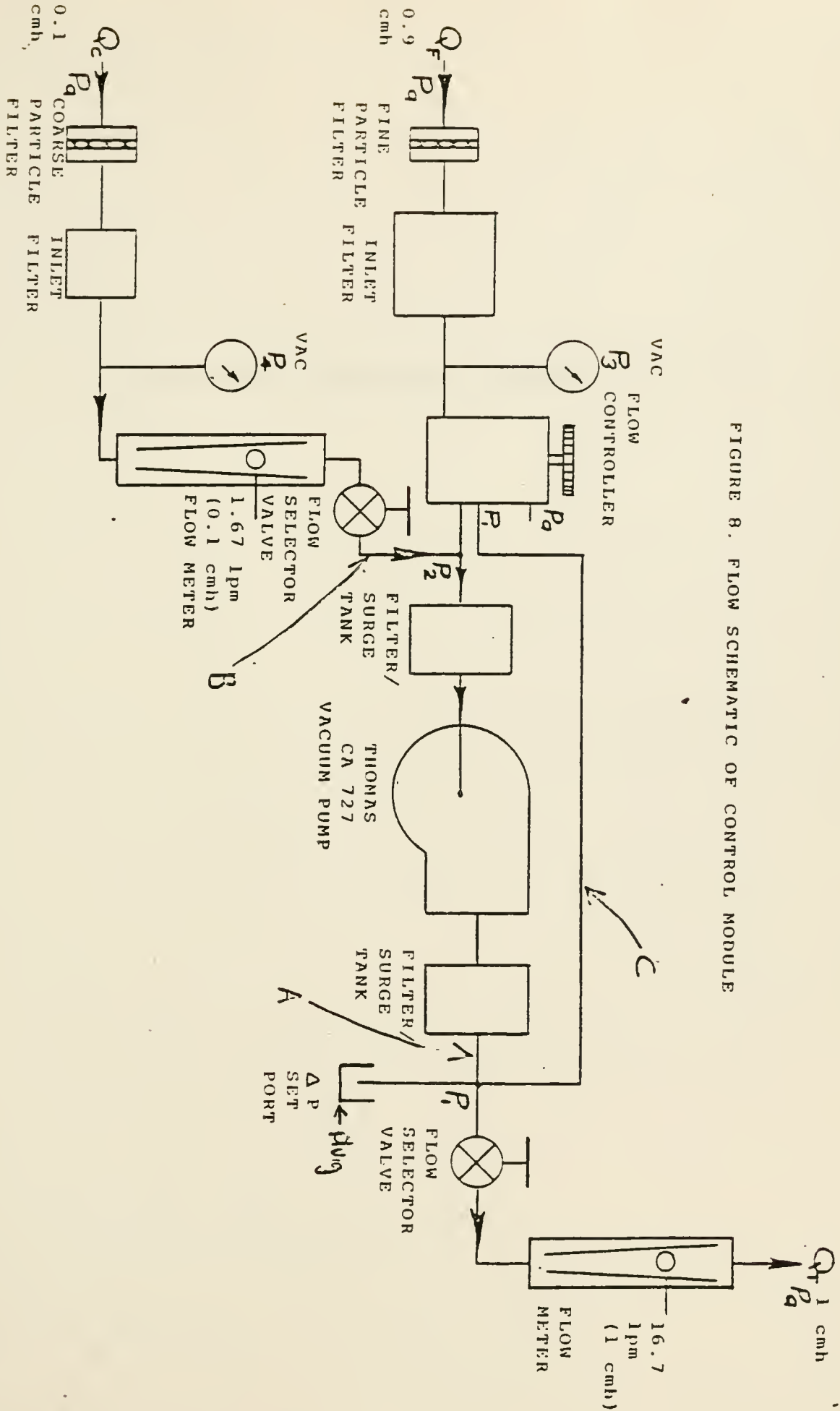
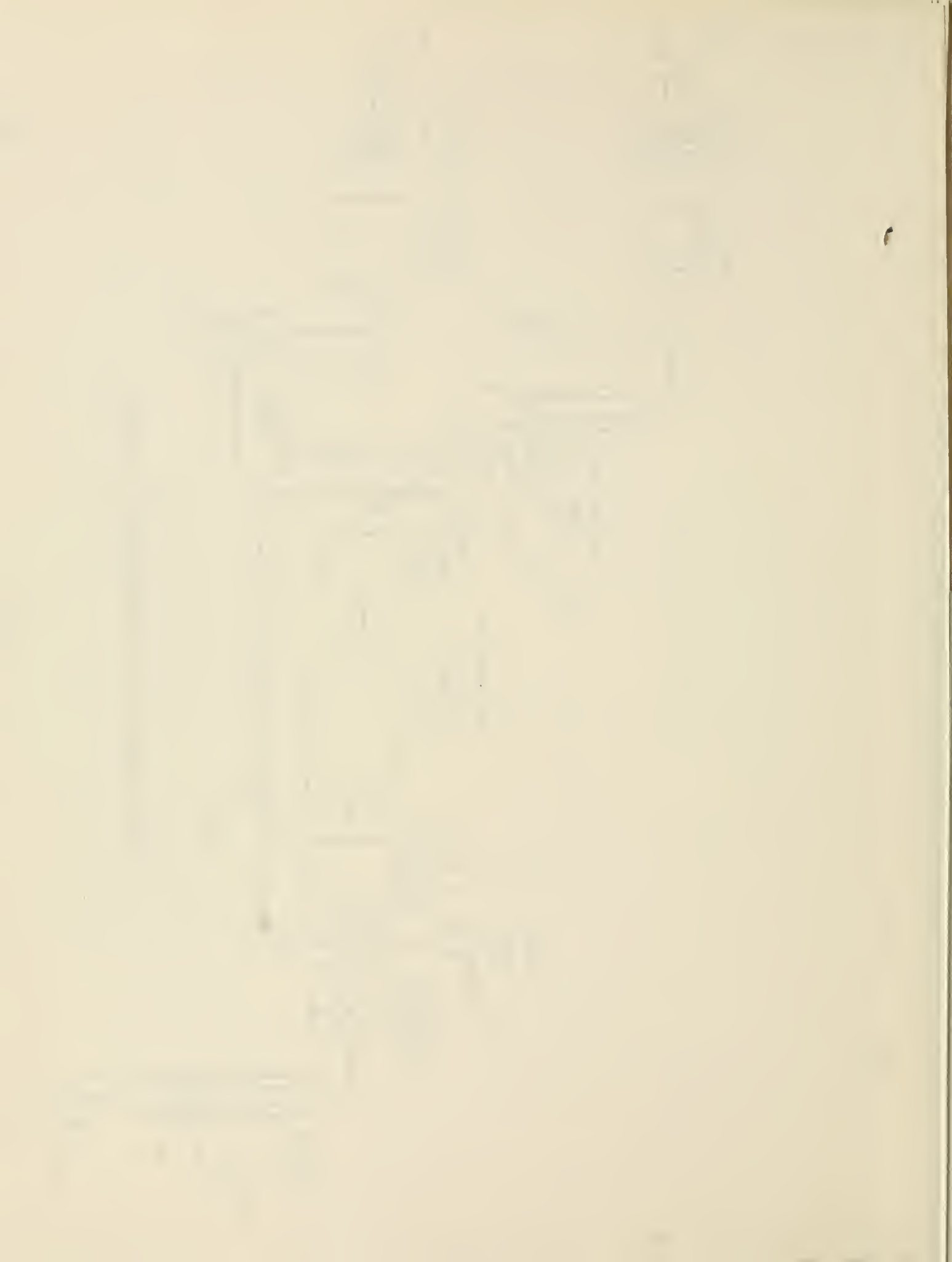
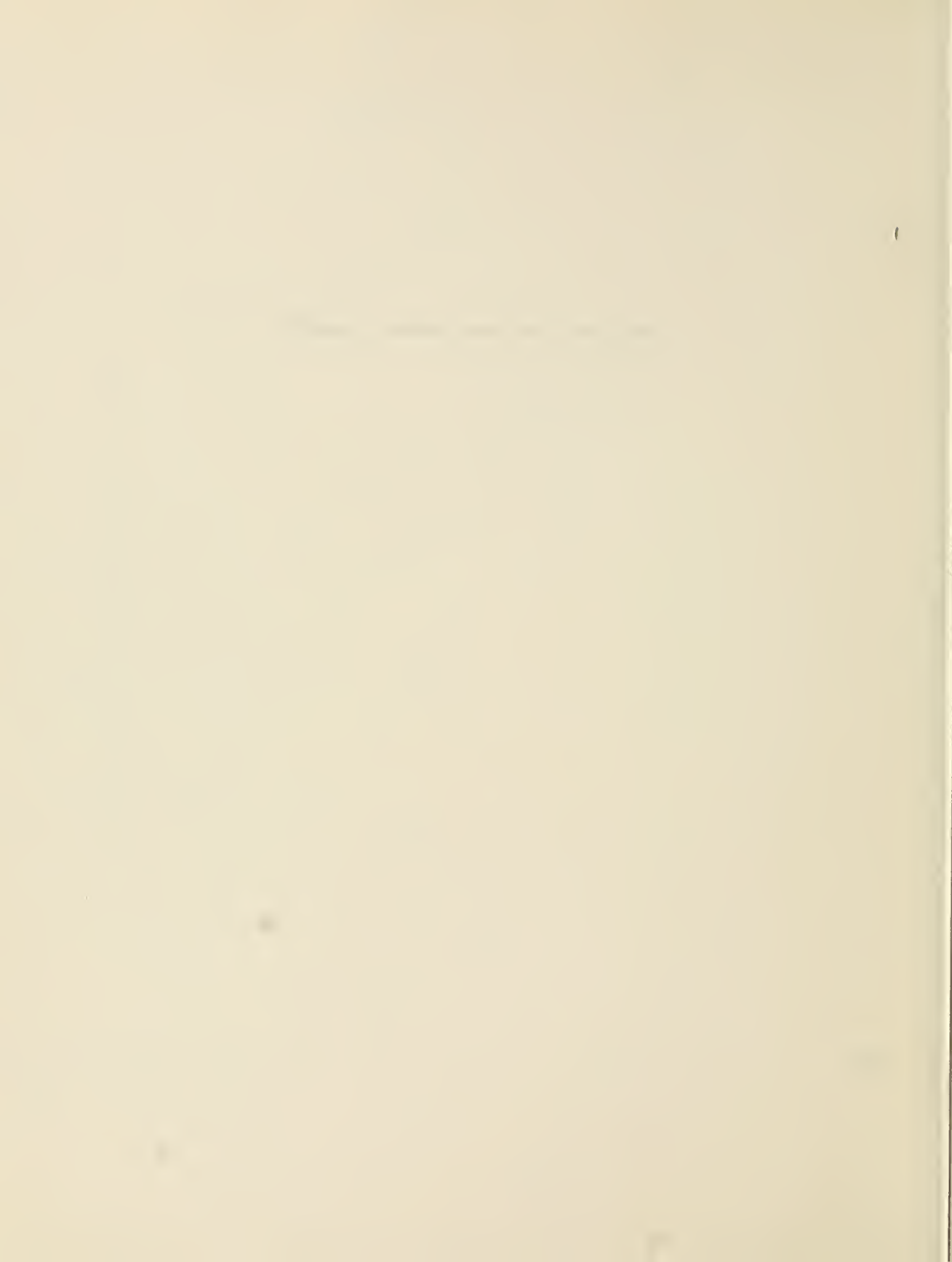


FIGURE 8. FLOW SCHEMATIC OF CONTROL MODULE



Additional Site Descriptions - undated



The following sites have been added to the network or are movements from previous sites.

Padbury Site:

UTM Coordinates = 5158900mN 424900mE zone 12

Altitude = 1230m

Equipment = high volume sampler and low volume sampler

Probe heights and separations = high vol intake is 3.0m above the ground; low vol intake at 3.2m The separation between the high vol and the lo vol probes is 1.9m

Distance from source = 4.6km

Bearing of site from source = 271 degrees N

This site functions as an upwind background monitor. It is located in a lightly used horse pasture. Since it is downwind from Helena, the site will record some influences from the city. The high volume sampler's roof ridge points NE/SW.

North quadrant - A very low trafficked gravel road is situated at a distance of 30m. The terrain out to 100m is gently rolling pasture. It is neither plowed nor cut for hay and the ground cover is generally complete.

East quadrant - The land is well covered pasture as defined in the North quad.

South quadrant - The land is pasture, similar to North and East, trending uphill to a hillock 300m away.

West quadrant - Again pasture out to 200m where Interstate 15 lies. The traffic level is high but the distance away from the site is sufficient to attenuate influence.

South Site:

UTM Coordinates = 5157900mN 430000mE zone 12

Altitude = 1200m

Equipment = high volume sampler



Probe heights and separations = high volume intake is 3.1m above the ground

Distance from source = 1.0km

Bearing of site from source = 147 degrees N

This site monitors impacts south of and close in to the smelter. It is placed next to an abandoned county gravel road running through a pasture with moderate ground cover. The sampler roofridge points E/W.

North quadrant - 30m north of the site is the end of a private gravel road. It could possibly raise dust in a high wind. Traffic is virtually non-existent.

15m to the northeast is a ditch, the sides of which are exposed stream sediments

The soil is principally sand, gravel, and water worn rocks. The groundcover is an incomplete network of grass clumps. The terrain is flat.

East quadrant - Soil and ground cover follow the description for North.

South quadrant - Similar to north. The old road heads due south and will be a source of dust during a high wind.

West quadrant - The terrain slopes down a distance of 75m to Prickly Pear creek.

The creek is about 5m below the groundlevel of the site. The creekbed has a considerable amount of exposed soil but wind entrainment is effectively stopped by the creek ditch and trees lining the banks.

Highway Site:

UTM Coordinates = 5159600mN 429300mE zone 12

Altitude = 1185m

Equipment = low volume sampler

Probe heights and separations = the sampler intake is 5.2m above the ground.

Distance from source = 0.9km

Bearing of site from source = 348 degrees N

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The site is located on the right-of-way for US highway 12 across the street from American Chemet. This station was originally outfitted with two high vols, a low vol, and a dichotomous sampler but, because of local pressure, never collected data of any significant continuity. The site was re-installed on September 28, 1981 as a low volume sampler. The site description is that of the second installation.

North quadrant - W Pacific Avenue, East Helena is located 10m away on the other side of a chain link fence. It is a paved road with low traffic. Across the street are one and two story residences. The house due North at a distance of 50m is burning wood and some data influence will occur during winter periods of northerly wind.

East quadrant - The terrain slopes down to the north. The ground is 30-50% covered with weeds. Some dust could be raised in a high wind.

South quadrant - Highway 12, a four lane major road, is located 15m away. Some lead and particulate influence is to be expected.

West quadrant - Similar to that described for the East quadrant.

Muffick Site:

UTM Coordinates = 5159700mN 429300mE zone 12

Altitude = 1185m

Equipment = two high volume samplers, a low volume sampler, and a dichotomous sampler.

Probe heights and separations = both hi vol intakes are 3.0m above groundlevel;
lo vol and dicot intakes are 3.1m high
east hi vol to lo vol separation = 0.8m
lo vol to dicot separation = 1.5m
dicot to west hi vol separation = 1.3m

Distance from source = 1.0km

Bearing of site from source = 349 degrees N

1870
The first of the year was a very dry one, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought.

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The fifth of the year was a very dry one, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought.

The site is located in a backyard of a personal residence positioned on corner of Pacific Ave. and Cleveland Ave. in East Helena. The site equipment was obtained from the Firehall site. The monitoring objective is pollution impacts on the side of East Helena closest to the smelter. The high volume sampler roof ridges point E/W.

North quadrant - A paved parking lot extends out to 30m where Main Street is located. Immediately below the site is an unused flower bed holding exposed soil and weeds.

East quadrant - 8m of gravel and sand extend to the paved surface of Cleveland Ave. Some dust may be raised in a high wind.

South quadrant - Sand and loam garden area for a distance of 10m then 20m of lawn to the paved surface of Pacific Ave.

West quadrant - lawn out to 10m where a small garage is located. The garage roof is the same height as the sampler intakes.

Hadfield Site:

UTM Coordinates = 5159700mN 429300mE zone 12

Altitude = 1185m

Equipment = two high volume samplers, a low volume sampler, and a dichotomous sampler

Probe heights and separations = both hi vol intakes are 3.6m above the ground; the lo vol intake is 4.0m high; the dicot intake is 3.7m high. The east hi vol to lo vol separation is 1.5m; the lo vol to dicot separation is 1.1m; the dicot to west hi vol separation = 1.3m

Distance from source = 1.0km

Bearing of site from source = 349 degrees N

This site is a replacement for the Muffick site, using the same equipment moved about 5m north of the Muffick location. As such the quadrant descriptions for the Muffick site are applicable. The high volume sampler roof ridges point East/West.

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Dartman Site:

UTM Coordinates = 5160500mN 429500mE zone 12

Altitude = 1175m

Equipment = high volume sampler; low volume sampler

Probe heights and separations = the high volume sampler intake is 3.3m above ground level. The low volume sampler intake is 3.4m high. The distance between the low volume and high volume intakes is 1.4m.

Distance of site from smelter stack = 1.8 km

Bearing of the site from the stack = 3 degrees N

The site is located in a field northeast of the Dartman residence. The bee yard is approximately 150m northeast of the site. The site location was chosen because Dartman has had a history of pollution impacts.

North quadrant - The quadrant out to 100m consists of a level field containing pasture grasses and weeds. The ground cover is more than sufficient to prevent dust re-entrainment. The field is neither plowed nor cut for hay. No sources or sinks of monitored pollutants were noticed.

East quadrant - This area follows the description for the North quadrant.

South quadrant - The area generally follows the description for the North quadrant with the exception of a line of tall deciduous trees 60m to the southwest.

West quadrant - This area is similarly a field. there are some low outbuildings 50m away.

14 May 81

PERFORMANCE AUDIT OF THE EAST HELENA LEAD STUDY:

FLOWRATES THROUGH SAMPLERS

David Weber

Ambient Technology

6/7/81



FLOWRATES THROUGH AMBIENT AIR SAMPLERS

On May 14, 1981 a selected portion of the high volume and low volume samplers maintained in the East Helena Lead Study were audited for flowrate calibration. Documentation supporting the traceability of the audit standards is attached.

High Volume Sampler:

	Station Value	Audit Value	% Difference
Microwave Site	37.4 scfm	35.8 scfm	+4.5%
Vollmer Site	35.3	35.5	-0.6
Canal Site	34.5	35.8	-3.6
A&W Site	41.2	34.0	+21.2
South Site	Station is running uncalibrated as of 6/81		

Low Volume Sampler:

	Station Value	Audit Value	% Difference
Vollmer Site	31.9 slpm	32.5 slpm	-1.8%
Canal Site	31.7 slpm	30.5 slpm	+3.9%

The only value exceeding the 10% acceptance criterion is the High Volume Sampler at the A&W Site. It is recommended that this parameter be recalibrated. The South Site was audited but has not yet been calibrated. It is recommended that this station be promptly calibrated.

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TRACEABILITY OF STANDARDS USED IN THE AUDITING OF

HIGH VOLUME SAMPLERS FOR FLOWRATE (Feb, 1981)

High volume samplers are audited at a single point, through one clean filter, using a Sierra calibration orifice and a water manometer. The orifice was calibrated with a rootsmeter maintained by the State of Montana Air Quality Bureau in Helena. This rootsmeter has been correlated with another rootsmeter owned by the Environmental Protection Agency Region 8 in Denver, Colorado. The Montana meter was found to read about 1.8% higher than the EPA meter. The EPA meter has been traced to the NBS. Calibration procedures and audit calculations follow those described in "Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates" EPA-600/4-78-047 and adopted by EPA Region 8 in their document "EPA Region VIII Policy on Correcting Total Suspended Particulate Data to Reference Condition, 1979." Ambient pressure during the audit was measured with an aneroid barometer that was referenced to a mercury barometer. The ambient temperature was determined with a Taylor thermometer that was calibrated with an ASTM 64C thermometer standard.

Calibration Check on the Aneroid Barometer; S/N SDHES 0633 7012

Aneroid = 654.3 mmHg	Mercurial = 655.2 mmHg	% Difference = -0.1%
----------------------	------------------------	----------------------

Calibration of the Field Thermometer; Taylor #21412-2

Referenced to an ASTM 64C certified thermometer.

by a linear regression on 6 data points:

Temperature (degrees C) = 0.5490 (reading in degrees F) - 17.4

Correlation Coefficient = 0.9998

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1970

Calibration of the Audit Orifice

The orifice was referenced to a General Metal Works Rootsmeter S/N 7379716.

Ambient Pressure during the calibration = 653.3 mmHg

Ambient Temperature = 296.3 degrees K

for 7 data points a ln-ln transformed linear regression gives:

$$Q \text{ (theoretical) scfm} = 17.054 \text{ (orifice vacuum in inches water)} ^{0.4963}$$

$$\text{Correlation Coefficient} = 0.9999$$

During the audit the flows are corrected to SAC using:

$$Q \text{ (std) scfm} = Q \text{ (theoretical) } \sqrt{[(P/760)(298/T)]}$$

where: P = audit pressure (mmHg) T = audit temperature (degrees Kelvin)

Calibration Data

Q theoretical	Orifice Vacuum
20.94 scfm	1.5 inches water
26.71	2.5
32.57	3.7
37.97	5.0
42.88	6.35
46.68	7.55
48.79	8.4

STANDARDS USED IN AUDITING LOW VOLUME SAMPLERS FOR FLOWRATE

The low volume sampler is audited for flowrate using a large Gilmont rotometer. The applicability of this technique has been previously investigated ("Investigation of Calibration Techniques for the NEA Low Volume Sampler", D. Weber 1981.) The rotometer was independently calibrated on the State of Montana Air Quality Bureau's Rootsmeter before being utilized for auditing. During the audit the ambient pressure and temperature are recorded using an aneroid barometer traceable to a mercurial reference and a field thermometer that has been calibrated with an ASTM 64C standard. The rotometer calibrated values given below are then corrected for P/T differences with the following formula.

$$\text{Actual Flow @ SAC} = (\text{Calculated Flow}) \{ \text{sqr root} [(P/760)(298/T)] \}$$

where: P = ambient pressure in mmHg and T = ambient temperature in degrees Kelvin

SAC = standard atmospheric conditions of 760mmHg & 298 degrees K.

Calibration of the Gilmont rotometer S/N E3903:

Flow (slpm)	Roto reading
70.49	72
58.49	61.5
47.01	51.5
37.03	42
27.05	32

By a linear regression:

$$\text{Calculated flow in slpm} = (1.0892)(\text{roto reading}) - 8.41$$

$$\text{Correlation Coefficient} = 0.9995$$

THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and change. From the first settlers to the present day, the nation has evolved through various stages of development. The early years were marked by exploration and settlement, followed by a period of rapid expansion and industrialization. The American Revolution was a pivotal moment in the nation's history, leading to the establishment of a new government and the declaration of independence. The 19th century was a time of great change, with the Civil War being a major event that shaped the nation's future. The 20th century has been a period of significant progress, with the United States becoming a world power and a leader in many fields. The future of the United States is uncertain, but the nation's history suggests that it will continue to grow and change in the years to come.

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THE HISTORY OF THE UNITED STATES

THE HISTORY OF THE UNITED STATES

28 July 81

PERFORMANCE AUDIT OF THE EAST HELENA LEAD STUDY:

FLOWRATES THROUGH SAMPLERS;

LABORATORY UNKNOWNNS

David Weber

Ambient Technology

8/11/81

FLOWRATES THROUGH HIGH VOLUME SAMPLERS

On July 28, 1981 a selected portion of the high volume samplers operated as part of the East Helena Lead Study were audited for flowrate calibration. Documentation supporting the traceability of the audit standards is attached. Station values were obtained by relaying Dickson recorder chart readings to the State Air Quality Bureau, obtaining a calibrated measurement, and correcting for station specific pressure and temperature values using the procedure defined the State Quality Assurance Manual.

High Volume Sampler:

	Station Value	Audit Value	% Difference
Highway Site (east hi vol)	33.3 scfm	32.9 scfm	+1.2%
Highway Site (west hi vol)	33.9	33.7	+0.6
Vollmer Site	34.5	34.9	-1.1
A&W Site	30.7	31.6	-2.8
Canal Site	33.3	33.4	-0.3
South Site	34.6	34.8	-0.6
Microwave Site	33.5	33.3	+0.6

The flowrate calibrations of the high volume samplers tested above are, in general, excellent. All % differences more than meet the 10% acceptance criterion.

TRACEABILITY OF STANDARDS USED IN THE AUDITING OF
HIGH VOLUME SAMPLERS FOR FLOWRATE (Feb, 1981)

High volume samplers are audited at a single point, through one clean filter, using a Sierra calibration orifice and a water manometer. The orifice was calibrated with a rootsmeter maintained by the State of Montana Air Quality Bureau in Helena. This rootsmeter has been correlated with another rootsmeter owned by the Environmental Protection Agency Region 8 in Denver, Colorado. The Montana meter was found to read about 1.8% higher than the EPA meter. The EPA meter has been traced to the NBS. Calibration procedures and audit calculations follow those described in "Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates" EPA-600/4-78-047 and adopted by EPA Region 8 in their document "EPA Region VIII Policy on Correcting Total Suspended Particulate Data to Reference Condition, 1979." Ambient pressure during the audit was measured with an aneroid barometer that was referenced to a mercury barometer. The ambient temperature was determined with a Taylor thermometer that was calibrated with an ASTM 64C thermometer standard.

Calibration Check on the Aneroid Barometer; S/N SDHES 0633 7012

Aneroid = 654.3 mmHg Mercurial = 655.2 mmHg % Difference = -0.1%

Calibration of the Field Thermometer; Taylor #21412-2

Referenced to an ASTM 64C certified thermometer.

by a linear regression on 6 data points:

Temperature (degrees C) = 0.5490 (reading in degrees F) - 17.4

Correlation Coefficient = 0.9998

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Calibration of the Audit Orifice

The orifice was referenced to a General Metal Works Rootsmeter S/N 7379716.

Ambient Pressure during the calibration = 653.3 mmHg

Ambient Temperature = 296.3 degrees K

for 7 data points a ln-ln transformed linear regression gives:

$$Q \text{ (theoretical) scfm} = 17.054 \text{ (orifice vacuum in inches water)} ^{0.4963}$$

$$\text{Correlation Coefficient} = 0.9999$$

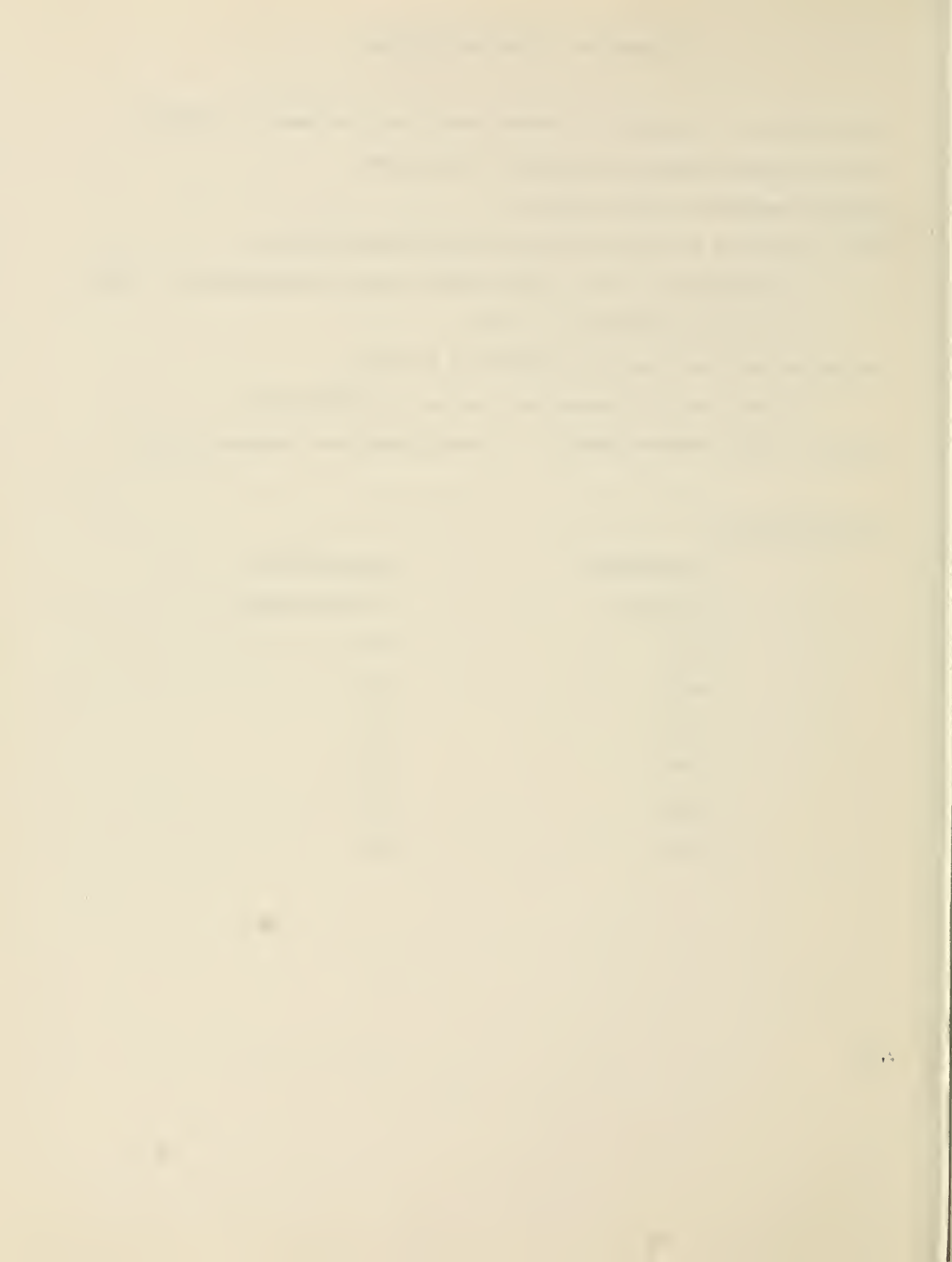
During the audit the flows are corrected to SAC using:

$$Q \text{ (std) scfm} = Q \text{ (theoretical) } \sqrt{[(P/760)(298/T)]}$$

where: P = audit pressure (mmHg) T = audit temperature (degrees Kelvin)

Calibration Data

Q theoretical	Orifice Vacuum
20.94 scfm	1.5 inches water
26.71	2.5
32.57	3.7
37.97	5.0
42.88	6.35
46.68	7.55
48.79	8.4



RESULTS OF THE LABORATORY QUALITY CONTROL SAMPLES

Weight Unknown:

	Audit Value	Lab Value	% Difference
Unknown #2	6.6976 g	6.6980 g	0.006%

Lead Unknown:

	Audit Value	Lab Value	% Difference
Unknown #8	97.1 ug Pb	103 ug Pb	+6.1%

The results are well within any expected error.

Low Volume TSP Sampler Calibrations

September 13, 1981

The following calibrations were performed on August 28, 1981 by David Weber using the NEA rotometer with an independent primary calibration on a rootsmeter. For traceability of the calibration please refer to the supporting documents for the June 7, 1981 performance audit. The Canal site needle valves were re-adjusted to bring the flow value into conformance with the other sites. This generates two calibration curves for the Canal site, one covering the timespan from the installation date to the calibration date (8/28/81) and the other applicable to the time interval from 8/28/81 to the present.

Canal Site: Installation date to 8/28/81

Flow @ SAC	Vacuum Reading
12.5 slpm	16.0 "Hg
9.4	17.2
7.4	17.9
5.3	18.6
2.3	19.8

$$\text{Flow} = -2.7134 (\text{Vacuum}) + 56.0 \quad \text{Correlation Coeff.} = 0.9995$$

$$\text{Fully closed vacuum} = 22.7 \text{ "Hg}$$

Canal Site: 8/28/81 to present

Flow @ SAC	Vacuum Reading	
34.3 slpm	7.0 "Hg	
27.7	9.8	Flow = -2.1942 (Vacuum) + 49.5
22.6	12.3	Correlation Coeff. = 0.9997
17.5	14.6	
12.5	17.0	Fully closed vacuum = 24.0 "Hg
7.4	19.1	

Transaction Details		Accounting Entry	
Date	Description	Debit	Credit
1/1/2024	Initial deposit		1000.00
1/5/2024	Withdrawal	500.00	
1/10/2024	Deposit		250.00
1/15/2024	Withdrawal	150.00	
1/20/2024	Deposit		750.00
1/25/2024	Withdrawal	250.00	
1/30/2024	Deposit		1000.00
2/1/2024	Withdrawal	500.00	
2/5/2024	Deposit		750.00
2/10/2024	Withdrawal	250.00	
2/15/2024	Deposit		1000.00
2/20/2024	Withdrawal	500.00	
2/25/2024	Deposit		750.00
2/28/2024	Withdrawal	250.00	

Vollmer Site: Installation date to present

Flow @ SAC	Vacuum Reading
34.6 slpm	7.4 "Hg
27.9	10.4
22.9	12.6
17.7	14.6
12.6	16.9
7.4	19.0

Flow = $-2.3508 (\text{Vacuum}) + 52.2$ Correlation Coeff. = 0.9998

Fully closed vacuum = 22.7 "Hg

All flows are expressed in liters per minute corrected to 760 mmHg and 298 degrees Kelvin. The vacuum readings are in "Hg as read from the oil damped gauge on each sampler.

The installation date for the Canal site sampler was _____

The installation date for the Vollmer site sampler was _____

Flow Volumes for the Dichotomous Sampler Data

East Helena Lead Study - September 13, 1981

The following list of flow volumes has been derived from field operator logs for the period from 4/16/81 to 8/26/81. Flow volumes are the total amount of sample air drawn through the filter on the sample date, expressed in cubic meters corrected to standard atmospheric conditions of 760 mmHg and 298 degrees Kelvin. Flow volume is a product of the sample time, as read from the elapsed time indicator, and flowrate, as determined by a rotometer. The rotometer calibrations are documented in the report entitled "Investigation of Calibration Techniques for the Dichotomous Sampler."

The quality of the data collected during this period varies widely. Factors effecting individual measurements have been expressed using comment codes. These codes are explained below:

Comment Codes:

- A = No elapsed time measurements were available. The unsupported assumption of a 24.00 hour sample was made.
- B = No rotometer data were available. It was assumed that typical flowrates occurred during the sampling (16.7 on the total & 1.67 on the coarse).
- C = The sampling time falls outside the EPA accepted limits of 24 hours +/- 15 minutes.
- D = No data were available.

Two large blocks of time contain no data. It is not presently known whether this represents a lack of sample collection or simply misplaced records. Therefore, this listing should not be considered complete. An addendum will be forwarded after investigation.

David Weber

OF GREAT BRITAIN AND IRELAND, VOL. LXXV, PART 1, 1905.

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THE ANTHROPOLOGY OF THE PRESENT. By H. H. S. GUTHRIE. 1

Sample Date	Site	Fine Volume	Coarse Volume	Comment Code
4/16/81	Firehall	21.9 cubic m	2.17 cubic m	A,B
4/16	Canal	22.9	2.19	B
4/19	Firehall	21.9	2.17	A,B
4/19	Canal	22.9	2.19	B
4/22	Firehall	21.9	2.17	A,B
4/22	Canal	22.9	2.19	B
4/25	Firehall	21.9	2.17	A,B
4/25	Canal	-	-	D power switch to time was turned off
4/28	Firehall	21.9	2.17	A,B
4/28	Canal	22.9	2.19	A,B
5/1	Firehall	21.9	2.17	A,B
5/1	Canal	22.9	2.19	A,B
5/4	Firehall	-	-	D
5/4	Canal	-	-	D
5/7	Firehall	18.2	1.81	B,C
5/7	Canal	22.9	2.19	B
5/10	Firehall	21.9	2.17	A,B
5/10	Canal	22.9	2.19	A,B
5/13	Firehall	-	-	D equipment with removed on 5-12-81
5/13	Canal	22.9	2.19	B
5/16	Firehall	-	-	D .PMC PL 5-13 81
5/16	Canal	-	-	D IN BIC HOT FILTER W/ C A/S/H/C
5/19	Firehall	-	-	D James AS 5-13 81
5/19	Canal	-	-	D James AS 5-16 81
5/22	Firehall	-	-	D James AS 5-13 81
5/22	Canal	-	-	D James AS 5-16 81
5/25	Firehall	-	-	D James AS 5-13 81
5/25	Canal	-	-	D James AS 5-16 81

Sample Date	Site	Fine Volume	Coarse Volume	Comment Code
5/28/81	Canal	22.9 cubic m	2.21 cubic m	
5/28	Microwave	15.5	1.49	C
5/31	Muffick	18.2	1.81	C
5/31	Canal	11.2	1.07	C
5/31	Microwave	-	-	D only RAN 11.74 Hrs / A power failure occurred
6/3	Muffick	18.2	1.81	C
6/3	Canal	22.9	2.21	
6/3	Microwave	22.7	2.18	A
6/6	Muffick	18.2	1.81	C
6/6	Canal	4.9	0.47	C
6/6	Microwave	-	-	D the DASH IS AT RESCUE DIRECTLY 80.0.0.0 (40)
6/9	Muffick	18.4	1.81	C
6/9	Canal	22.9	2.19	
6/9	Microwave	22.7	2.19	
6/12	Muffick	18.2	1.81	C
6/12	Canal	22.9	2.19	
6/12	Microwave	22.7	2.18	
6/15	Muffick	18.2	1.81	C
6/15	Canal	22.9	2.19	
6/15	Microwave	22.7	2.18	
6/18	Muffick	18.2	1.81	C
6/18	Canal	22.9	2.19	
6/18	Microwave	22.7	2.18	
6/21	Muffick	-	-	D THIS SITE WAS MOVED TO THE KLEO SITE ON 6/22/81 WHICH WAS THE MUFFICK SITE 6/21/81
6/21	Canal	22.9	2.19	
6/21	Microwave	22.7	2.18	
6/24	Muffick	-	-	D LAMP IS 6-21-81
6/24	Canal	12.4	1.17	C

Sample Date	Site	Fine Volume	Coarse Volume	Comment Code
6/24/81	Microwave	22.7 cubic m	2.18 cubic m	
6/27	Muffick	-	-	D SAME AS 6-27-81
6/27	Canal	22.9	2.19	
6/27	Microwave	-	-	D THE ROCKET BATTERY IS GIVEN AND WASNT REPAIRED
6/30	Microwave	-	-	D MAT. 8-23-81
6/30	Canal	5.8	0.55	C
7/3	Microwave	-	-	D SAME AS 6-27-81
7/3	Canal	22.9	2.19	
7/6	Microwave	-	-	D SAME AS 6-27-81
7/6	Canal	6.4	0.61	C
7/9	Microwave	-	-	D SAME AS 6-27-81
7/9	Canal	-	-	D NOT RUNNING CORRECTLY WASNT REPAIRED 24 Hrs REPAIRED 8-23-81
7/12	Microwave	-	-	D SAME AS 6-27-81
7/12	Canal	-	-	D SAME AS 7-9-81
7/15	Microwave	-	-	D SAME AS 6-27-81
7/15	Canal	-	-	D SAME AS 7-9-81
7/18	Microwave	-	-	D SAME AS 6-27-81
7/18	Canal	-	-	D SAME AS 7-9-81
7/21	Microwave	-	-	D SAME AS 6-27-81
7/21	Canal	-	-	D SAME AS 7-9-81
7/24	Microwave	-	-	D SAME AS 6-27-81
7/24	Canal	-	-	D SAME AS 7-9-81
7/27	Microwave	-	-	D SAME AS 6-27-81
7/27	Canal	-	-	D SAME AS 7-9-81
7/30	Microwave	-	-	D SAME AS 6-27-81
7/30	Canal	-	-	D SAME AS 7-9-81
8/2	Microwave	-	-	D SAME AS 6-27-81
8/2	Canal	-	-	D SAME AS 7-9-81

Sample Date	Site	Fine Volume	Coarse Volume	Comment Code
8/5/81	Microwave	-	-	D SAME AS 6-27-81
8/5	Canal	-	-	D SAME AS 7-9-81
8/8	Microwave	-	-	D SAME AS 6-27-81
8/8	Canal	-	-	D SAME AS 7-9-81
8/11	Microwave	-	-	D SAME AS 6-27-81
8/11	Canal	-	-	D SAME AS 7-9-81
8/14	Microwave	-	-	D SAME AS 6-27-81
8/14	Canal	-	-	D SAME AS 7-9-81
8/17	Microwave	-	-	D SAME AS 6-27-81
8/17	Canal	-	-	D SAME AS 7-9-81
8/20	Microwave	-	-	D SAME AS 6-27-81
8/20	Canal	0.9	0.08	C
8/20	Hadfield	0.8	0.07	C
8/23	Microwave	22.7	2.18	B
8/23	Canal	23.1	2.19	
8/23	Hadfield	21.9	2.18	
8/26	Microwave	32.1	3.09	C
8/26	Canal	22.9	2.19	
8/26	Hadfield	21.9	2.17	

14 Sept. 81

PERFORMANCE AUDIT OF THE EAST HELENA LEAD STUDY
FLOWRATES THROUGH SAMPLERS

David Weber
Ambient Technology
10/5/81

FLOWRATES THROUGH AMBIENT SAMPLERS

On September 14, 1981 a selected portion of the ambient samplers maintained in the East Helena Lead study were audited for flowrate calibration. Documentation supporting the audit methods and the traceability of the audit standards is attached.

High Volume Sampler:

<u>Site</u>	<u>Station Value</u>	<u>Audit Value</u>	<u>% Difference</u>
Padbury	27.9 scfm	31.4 scfm	-11.1%

Low Volume Sampler:

Padbury	27.1 slpm	28.9 slpm	-6.2%
Hadfield	33.3 slpm	32.9 slpm	+1.2%
Canal	36.5 slpm	34.6 slpm	+5.6%
Vollmer	36.4 slpm	34.1 slpm	+6.7%

Dichotomous Sampler:

Hadfield (fine)	15.2 slpm	14.5 slpm	+4.8%
Hadfield (coarse)	1.51 slpm	1.49 slpm	+1.3%
Canal (fine & coarse)	Sampler has not yet been retrofitted for calibration.		
Microwave (fine & coarse)	Sampler has not yet been retrofitted for calibration.		

The only value exceeding the 10% acceptance criterion is the high volume sampler at the Padbury site. The dichotomous samplers at the Microwave and the Canal sites need to be retrofitted before they can either be calibrated or audited. A new calibration affecting all samplers will become active on the October 1, 1981 sample day. The dichotomous samplers will be retrofitted at this time.

TRACEABILITY OF STANDARDS USED IN THE AUDITING OF
HIGH VOLUME SAMPLERS FOR FLOWRATE (Feb, 1981)

High volume samplers are audited at a single point, through one clean filter, using a Sierra calibration orifice and a water manometer. The orifice was calibrated with a rootsmeter maintained by the State of Montana Air Quality Bureau in Helena. This rootsmeter has been correlated with another rootsmeter owned by the Environmental Protection Agency Region 8 in Denver, Colorado. The Montana meter was found to read about 1.8% higher than the EPA meter. The EPA meter has been traced to the NBS. Calibration procedures and audit calculations follow those described in "Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates" EPA-600/4-78-047 and adopted by EPA Region 8 in their document "EPA Region VIII Policy on Correcting Total Suspended Particulate Data to Reference Condition, 1979." Ambient pressure during the audit was measured with an aneroid barometer that was referenced to a mercury barometer. The ambient temperature was determined with a Taylor thermometer that was calibrated with an ASTM 64C thermometer standard.

Calibration Check on the Aneroid Barometer; S/N SDHES 0633 7012

Aneroid = 654.3 mmHg Mercurial = 655.2 mmHg % Difference = -0.1%

Calibration of the Field Thermometer; Taylor #21412-2

Referenced to an ASTM 64C certified thermometer.

by a linear regression on 6 data points:

Temperature (degrees C) = 0.5490 (reading in degrees F) - 17.4

Correlation Coefficient = 0.9998

Calibration of the Audit Orifice

The orifice was referenced to a General Metal Works Rootsmeter S/N 7379716.

Ambient Pressure during the calibration = 653.3 mmHg

Ambient Temperature = 296.3 degrees K

for 7 data points a ln-ln transformed linear regression gives:

$$Q \text{ (theoretical) scfm} = 17.054 \text{ (orifice vacuum in inches water)}^{0.4963}$$

$$\text{Correlation Coefficient} = 0.9999$$

During the audit the flows are corrected to SAC using:

$$Q \text{ (std) scfm} = Q \text{ (theoretical) } \sqrt{[(P/760)(298/T)]}$$

where: P = audit pressure (mmHg). T = audit temperature (degrees Kelvin)

Calibration Data

Q theoretical	Orifice Vacuum
20.94 scfm	1.5 inches water
26.71	2.5
32.57	3.7
37.97	5.0
42.88	6.35
46.68	7.55
48.79	8.4

STANDARDS USED IN AUDITING DICHOTOMOUS SAMPLERS FOR FLOWRATE

The dichotomous sampler is audited for flowrate on the "coarse" and "fine" particulate channels using massflowmeters. The method for connecting the mass-flowmeters into the sampler plumbing is explained in the document "Investigation of Calibration Techniques for the Dichotomous Sampler", D. Weber 1981. The actual measured parameters are coarse and total flow. The fine flow is determined by $(\text{fine}) = (\text{total}) - (\text{coarse})$. The audit of each channel occurs at a single flowpoint representing the normal sample flow (ie. 1.67 on the coarse rotometer and 16.7 on the total rotometer).

Calibration of the Massflowmeters

Two massflowmeters, Tylan 0-5 standard liters per minute (slpm) S/N 8023025 and 0-20 slpm S/N 8073007 were calibrated with a Hastings bubble flowmeter that is traceable to an NBS volume standard. A linear regression equation is generated for each flowmeter.

0-5 slpm:

Flow at 298 degrees K and 760 mmHg in slpm = $4.771 (\text{massflowmeter volts}) + 0.103$

Correlation Coefficient = 0.9999 over 8 points

0-20 slpm:

Flow at 298 degrees K and 760 mmHg in slpm = $2.194 (\text{massflowmeter volts}) + 0.083$

Correlation Coefficient = 0.9998 over 6 points

Ambient Pressure during the calibration was measured with an aneroid barometer that was referenced to a mercurial barometer. Aneroid=654.3mmHg Mercury=655.2
Ambient temperature was measured with a Taylor thermometer that has been calibrated with an ASTM 64C standard.

The time base was an electronic stopwatch with a +/- 100ppm crystal that has been checked with WWV transmissions.

STANDARDS USED IN AUDITING LOW VOLUME SAMPLERS FOR FLOWRATE

The low volume sampler is audited for flowrate using a large Gilmont rotometer. The applicability of this technique has been previously investigated ("Investigation of Calibration Techniques for the NEA Low Volume Sampler", D. Weber 1981.) The rotometer was independently calibrated on the State of Montana Air Quality Bureau's Rootsmeter before being utilized for auditing. During the audit the ambient pressure and temperature are recorded using an aneroid barometer traceable to a mercurial reference and a field thermometer that has been calibrated with an ASTM 64C standard. The rotometer calibrated values given below are then corrected for P/T differences with the following formula.

$$\text{Actual Flow @ SAC} = (\text{Calculated Flow}) \{ \sqrt{(P/760)(298/T)} \}$$

where: P = ambient pressure in mmHg and T= ambient temperature in degrees Kelvin

SAC = standard atmospheric conditions of 760mmHg & 298 degrees K.

Calibration of the Gilmont rotometer S/N E3903:

Flow (slpm)	Roto reading
70.49	72
58.49	61.5
47.01	51.5
37.03	42
27.05	32

By a linear regression:

$$\text{Calculated flow in slpm} = (1.0892)(\text{roto reading}) - 8.41$$

$$\text{Correlation Coefficient} = 0.9995$$

JAN 20 1982

East Helena Lead Study
Description of Sample Collecting in the Field for the Period
October 1, 1981 to December 30, 1981

On October 1, 1981 Ambient Technology took over air sample collecting procedures for the East Helena Lead Study. Immediately prior to this date we overhauled the sampling network and made the following modifications. We placed all the monitors at a site on a single timer thus reducing possible errors generated by the operator mis-setting or forgetting to set a sampler timer. We rebuilt the pumps in two NEA low volume samplers. Naked 120 VAC electrical contacts in three high volume samplers were covered, thus improving the safety of the system. Nine high volume samplers had motor cushions and brushes replaced. We calibrated all the monitors repairing those that demonstrated operating problems. Several high volume samplers needed rebuilding of the aluminum housing. We installed the Highway site. After this network overhaul we subcontracted and trained Jim Robbins and Chere Jiusto as site operators. They performed the filter changes every third day. Once a week the sites were inspected for maintenance problems and the operators' tasks were quality checked. Operator errors decreased rapidly during the first weeks and stayed quite low. The early part of the sampling period was plagued by insufficient filter stocks but by November we had worked out this problem with NEA, the filter supplier. After the initial overhaul, maintenance was remarkably low. A low volume pump burned out at Hastie. We rebuilt this pump converting it to oil-less operation. A dichotomous sampler pinched a plastic tube shutting down flow and invalidating a sample. It was repaired. Breaker tripping problems at the Padbury site were eliminated by upgrading the breaker. A similar problem at the Hastie site was alleviated the same way. During the midpoint of the period all sites were performance audited for flowrates. All samplers were within 10%. Those with errors exceeding 5% were recalibrated. The sampling period had 633 possible filters out of which 60 were invalidated giving a collection efficiency of 90.5%.

PERFORMANCE AUDIT OF THE EAST HELENA AIR MONITORING SYSTEM;
FLOWRATES THROUGH SAMPLERS

David Weber
Ambient Technology
12/1/81

FLOWRATES THROUGH SAMPLERS

On December 1, 1981 eleven high volume samplers and six low volume samplers operated in the East Helena Lead Study were audited for flowrate calibration. Documentation supporting the audit methods and traceability of the audit standards is attached.

High Volume Sampler:

<u>Site</u>	<u>Station Value</u>	<u>Audit Value</u>	<u>% Difference</u>
Hadfield East	1.021 scmm	1.080 scmm	-5.5%
Hadfield West	1.106	1.065	+3.9
Dartman	1.013	1.021	-0.8
Hastie	1.066	0.972	-8.8
South	1.015	0.981	+3.5
Microwave	1.047	1.054	-0.7
Vollmer	1.050	1.098	-4.4
Canal	1.044	1.098	-4.9
A&W	1.031	1.004	+2.7
Diehls	0.828	0.900	-8.0
Padbury	1.073	1.042	+3.0

note: scmm = standard cubic meters per minute

Low Volume Sampler:

<u>Site</u>	<u>Station Value</u>	<u>Audit Value</u>	<u>% Difference</u>
Hadfield	36.7 slpm	38.1 slpm	-3.7%
South	31.1	28.4	+9.5
Hastie	37.4	34.3	+9.0
Padbury	27.9	28.8	-3.1
Dartman	35.3	36.4	-3.0
Highway	33.3	33.3	0.0

note: slpm = standard liters per minute

All values are within the acceptance criterion of +/- 10% difference. The high volume samplers at Hadfield East and Hastie were recalibrated. The low volume samplers at South and Hastie were recalibrated.

STANDARDS USED IN AUDITING LOW VOLUME SAMPLERS FOR FLOWRATE

The low volume sampler is audited for flowrate using a large Gilmont rotometer. The applicability of this technique has been previously investigated ("Investigation of Calibration Techniques for the NEA Low Volume Sampler", D. Weber 1981.) The rotometer was independently calibrated on the State of Montana Air Quality Bureau's Rootsmeter before being utilized for auditing. During the audit the ambient pressure and temperature are recorded using an aneroid barometer traceable to a mercurial reference and a field thermometer that has been calibrated with an ASTM 64C standard. The rotometer calibrated values given below are then corrected for P/T differences with the following formula.

$$\text{Actual Flow @ SAC} = (\text{Calculated Flow}) \{ \sqrt{(P/760)(298/T)} \}$$

where: P = ambient pressure in mmHg and T = ambient temperature in degrees Kelvin

SAC = standard atmospheric conditions of 760mmHg & 298 degrees K.

Calibration of the Gilmont rotometer S/N E3903:

Flow (slpm)	Roto reading
70.49	72
58.49	61.5
47.01	51.5
37.03	42
27.05	32

By a linear regression:

$$\text{Calculated flow in slpm} = (1.0892)(\text{roto reading}) - 8.41$$

$$\text{Correlation Coefficient} = 0.9995$$

TRACEABILITY OF STANDARDS USED IN THE AUDITING OF
HIGH VOLUME SAMPLERS FOR FLOWRATE (Feb, 1981)

High volume samplers are audited at a single point, through one clean filter, using a Sierra calibration orifice and a water manometer. The orifice was calibrated with a rootsmeter maintained by the State of Montana Air Quality Bureau in Helena. This rootsmeter has been correlated with another rootsmeter owned by the Environmental Protection Agency Region 8 in Denver, Colorado. The Montana meter was found to read about 1.8% higher than the EPA meter. The EPA meter has been traced to the NBS. Calibration procedures and audit calculations follow those described in "Investigation of Flowrate Calibration Procedures Associated with the High Volume Method for Determination of Suspended Particulates" EPA-600/4-78-047 and adopted by EPA Region 8 in their document "EPA Region VIII Policy on Correcting Total Suspended Particulate Data to Reference Condition, 1979." Ambient pressure during the audit was measured with an aneroid barometer that was referenced to a mercury barometer. The ambient temperature was determined with a Taylor thermometer that was calibrated with an ASTM 64C thermometer standard.

Calibration Check on the Aneroid Barometer; S/N SDHES 0633 7012

Aneroid = 654.3 mmHg Mercurial = 655.2 mmHg % Difference = -0.1%

Calibration of the Field Thermometer; Taylor #21412-2

Referenced to an ASTM 64C certified thermometer.

by a linear regression on 6 data points:

Temperature (degrees C) = $0.5490 (\text{reading in degrees F}) - 17.4$

Correlation Coefficient = 0.9998

Calibration of the Audit Orifice

The orifice was referenced to a General Metal Works Rootsmeter S/N 7379716.

Ambient Pressure during the calibration = 653.3 mmHg — — —

Ambient Temperature = 296.3 degrees K

for 7 data points a ln-ln transformed linear regression gives:

$$Q \text{ (theoretical) scfm} = 17.054 (\text{orifice vacuum in inches water})^{0.4963}$$

$$\text{Correlation Coefficient} = 0.9999$$

During the audit the flows are corrected to SAC using:

$$Q \text{ (std) scfm} = Q \text{ (theoretical)} \sqrt{[(P/760)(298/T)]}$$

where: P = audit pressure (mmHg) T = audit temperature (degrees Kelvin)

Calibration Data

Q theoretical	Orifice Vacuum
20.94 scfm	1.5 inches water
26.71	2.5
32.57	3.7
37.97	5.0
42.88	6.35
46.68	7.55
48.79	8.4

Dec 81

Report of Inspection of the ASARCO Meteorological Monitors

During December, 1981 four meteorological monitoring sites operated by ASARCO in the vicinity of East Helena, Montana were inspected. Two parameters, wind speed and wind direction, were checked for response on both the stripchart and the data acquisition system. While one person remained with the recorders a second person toured the field sites generating specific signals on the sensors. Wind speed was checked for zero and the presence of an upscale response. Wind direction was checked for response to a 360 degree north signal as determined by a compass reading corrected for local magnetic declination. The stripchart was the first recording device investigated. At a later date the data acquisition response was simultaneously compared with the stripchart response thus generating a parametric conversion which compared the data system to the original sensor manipulations, the assumptions being that the stripchart and translator calibrations were invariant between the two investigation dates and that the stripchart responses were linear.

<u>Site</u>	<u>Actual</u>	<u>Stripchart Reading</u>	<u>Computer Reading</u>
Water Tank	360 degrees N	* 50 degrees N	* 99 degrees N
Kleffner Rd	360	* 315 degrees N	* 18 degrees N
Microwave	360	* 30 degrees N	354 degrees N
Hadfield	360	* 345 degrees N	4 degrees N
Water Tank	0 mph	2.5 mph	N/A
Kleffner Rd	0 mph	* 4.0 mph	N/A
Microwave	0 mph	2.0 mph	N/A
Hadfield	0 mph	2.5 mph	N/A
Water Tank	upscale mph	ok	ok
Kleffner Rd	upscale mph	ok	ok
Microwave	upscale mph	ok	ok
Hadfield	upscale mph	ok	ok

The disparity in 7 of the 20 tests is significant as indicated by (*).

General Observations:

- 1) The wind vane at the Water Tank site is bent down. This will influence the threshold response but not the absolute reading.
- 2) On both days the computer meteorological synopsis gave a reading for highly unstable air. However, visual observation coming down the Winston hill showed the Helena valley trapped under an inversion (stagnant and stable).

Recommendations:

The ASARCO supplied meteorological data should not be used for the interpretation of ambient air sampling data.

Comparison of National Weather Service Helena Meteorological Data with
ASARCO Reported Data for the Short Term Monitoring Period 6/24/81 - 9/22/81

Wind speed and direction data from the NWS station at the Helena airport and the ASARCO short term monitoring period printout (see attached) were compared. Variable width acceptance criteria were applied to the NWS data. ASARCO data for the same day were interrogated to see whether or not they fell within the limits of acceptance. The limits and the percentages of agreement are tabulated below. Both windspeed and direction are 24 hour averages. There were 29 data points in the comparison.

Wind Direction:

79% agreement within +/- 90 degrees
62% agreement within +/- 60 degrees
52% agreement within +/- 45 degrees
45% agreement within +/- 30 degrees
28% agreement within +/- 15 degrees
28% agreement within +/- 10 degrees
10% agreement within +/- 5 degrees

Wind Speed:

100% agreement within +/- 7 mph
97% agreement within +/- 5 mph
90% agreement within +/- 4 mph
76% agreement within +/- 3 mph
55% agreement within +/- 2 mph
28% agreement within +/- 1 mph
14% agreement within +/- .5 mph

As can be seen the wind speed correlations are within expected limits but the wind direction is marginal with only slightly more than half of the ASARCO values falling within a 90 degree sector centered on the NWS value. The ASARCO supplied computer printout does not indicate which monitoring site was used to generate the reported data.

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[illegible]

HYPERGES

(FROM ASARCO LAB-90 DAY)

(FROM STATE LAB-99 DAY)

[illegible]

Chronology of Site and Equipment Movements

Because site locations and monitoring equipment have been shifted around dramatically during the course of this study we have listed a chronology below.

- Firehall site equipped with two high volume samplers, one low volume sampler, and one dichotomous sampler for the period from 1/22/81 to 5/10/81. The site was operated every 3rd day until it was discontinued after 5/10/81.
- Canal site equipped with one high volume sampler, one low volume sampler, and one dichotomous sampler from 1/10/81 to 9/28/81. This was changed to one high volume sampler for the period from 10/1/81 through 12/30/81. The site was operated every 3rd day from 1/10/81 to 9/28/81 and every 6th day from 10/1/81 to 12/30/81.
- Microwave site equipped with a high volume sampler from 4/25/81 to 5/28/81 when a dichotomous sampler was added. The dichotomous sampler was discontinued on 9/28/81. The high volume sampler was maintained for the period of 10/1/81 through 12/30/81. The site was operated every 3rd day from 4/25/81 through 9/28/81 and every 6th day from 10/1/81 to 12/30/81.
- Vollmer site equipped with a high volume sampler and a low volume sampler from 1/10/81 to 9/28/81 and with only a high volume sampler from 10/1/81 to 12/30/81. The site was operated every 3rd day 1/10/81 to 9/28/81 and every 6th day from 10/1/81 to 12/30/81.
- South site equipped with a high volume sampler from 5/22/81 to 9/28/81. For the period of 10/1/81 to 12/30/81 the site had a high volume sampler, a low volume sampler and a dichotomous sampler. The site ran every 3rd day throughout the entire period.
- Muffick site equipped with two high volume samplers, a low volume sampler, and a dichotomous sampler from 5/31/81 to 6/18/81 when it was discontinued. It ran every 3rd day.
- Highway site equipped with two high volume samplers, a low volume sampler, and a dichotomous sampler. It collected data for one day, 8/5/81. The site was reinstalled with only a low volume sampler for the period 10/1/81 to 12/30/81. It ran every 3rd day.
- Hadfield site equipped with two high volume samplers, a low volume sampler, and a dichotomous sampler for the period 9/20/81 to 12/30/81. It ran every 3rd day.
- Dartman site equipped with a high volume sampler and a low volume sampler for the period 10/1/81 to 12/30/81. It ran every 3rd day.
- Padbury site equipped with a high volume sampler and a low volume sampler for the period 5/31/81 to 12/30/81. It ran every 3rd day.
- A&W site equipped with a high volume sampler for the entire study. It ran every 6th day. (1/6/81 to 12/30/81)
- Bank site equipped with a high volume sampler for the entire study. It ran every 6th day.
- Hastie site equipped with a high volume sampler for the period of 1/4/81 to 9/28/81 and with a high volume sampler, a low volume sampler, and a dichotomous sampler for the period 10/1/81 to 12/30/81. It ran every 3rd day.
- California site equipped with a low volume sampler and a high volume sampler. It collected data for only one day, 1/10/81.
- Kleffner Road site equipped with a low volume sampler and a high volume sampler. It did not collect any data.

Appendix K

Evaluation of Polymer Films as Standards for X-Ray Fluorescence Spectrometers

EVALUATION OF POLYMER FILMS AS STANDARDS FOR X-RAY
FLUORESCENCE SPECTROMETERS

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INTRODUCTION

X-ray fluorescence (XRF) is a useful method for determining the elemental composition of aerosol particles collected on membrane filters. Advantages of the method include its speed, sensitivity, and ability to analyze many elements at once. Also, it is nondestructive and requires no sample preparation. However, to realize these advantages, two factors which limit the form of both the unknown samples and calibration standards must be dealt with.

The first factor is that many XRF spectrometers have a sensitivity profile that varies across the sample diameter (Goulding et al., 1978). Thus, if the aerosol deposit is nonuniform, quantitative analysis is difficult. However, quantitative analysis is feasible if both the samples and standards are uniform across their diameters.

The second factor is that X-rays are attenuated by individual particles in a sample as well as by the sample bulk itself. This imposes constraints on the thicknesses of both samples and standards. Ideal standards would have particulate size distribution, mass per unit area and composition that exactly match the unknown samples. Such standards are impractical because it is difficult to control the composition and size distribution accurately.

A more practical method of calibrating an XRF spectrometer for quantitative analysis of aerosol samples is to use a set of thin, single-element standards. Each standard contains one of the elements to be analyzed. Only a single concentration is needed for each element if it is in

the instrument's linear range and if there is an appropriate method to account for background. The standards must also be thin to avoid significant X-ray attenuation. Any attenuation within a sample can be accounted for mathematically (See for example Dzubay and Nelson, 1975; Criss, J.W., 1976; Loo et al., 1977.). If the particle size distribution is not known exactly, the uncertainty in the attenuation correction can be estimated.

Single element standards are appropriate for multielement samples when the associated X-ray spectra are resolved into single element components. Such resolution can be accomplished mathematically for interfering X-ray lines in energy dispersive X-ray fluorescence (EDXRF) spectrometers (See for example Salmon, 1961; Arinc et al., 1976; Drane et al., 1980.), or it can be accomplished instrumentally by the inherent high resolution of wavelength dispersive X-ray fluorescence (WDXRF) spectrometers.

Two types of thin, single-element standards are available commercially in the United States. In one, standard solutions prepared from pure substances are deposited on membrane filters and dried uniformly (Pradzynski and Rhodes, 1976). In the other type, a thin metal layer is deposited on plastic film in a vacuum. The mass of the metal film is determined by weighing the substrate before and after the film is deposited. Although X-ray attenuation occurs in both types of standards, the effect can be measured or calculated accurately, which enables equivalent thin standards to be determined. In addition, the National Bureau of Standards is developing standards consisting of sputtered glass deposits that contain trace elements (Pella, 1980).

A new type of standard consisting of metals incorporated into polymer films has been described recently (Dzubay et al., 1977 and Billiet et al., 1980). By using conventional film casting techniques, a single facility can produce enough polymer film to serve as standards for a large number of XRF laboratories. Compared to conventional dried solution deposits and vapor deposited metal film standards, the polymer films are easier to replicate precisely and are physically more rugged.

In this paper we describe a set of nine polymer film standards for 18 elements ranging in atomic numbers from 22 to 82. Each standard contains two elements chosen so that their characteristic X-rays do not interfere. Even escape peaks, associated with EDXRF spectrometers, do not interfere. Thus, each two-element standard is equivalent to a pair of single element standards. We also describe an attempt to make a stable polymer film containing mercury.

PREPARATION

The films were prepared from accurately weighed amounts of polymer and organometallic compounds dissolved in common solvents. The polymers used were cellulose acetate propionate (CAP) and cellulose acetate butyrate (CAB). The polymer used with each pair of elements is indicated in Table I. For most of the metals, the organometallic compounds used were acetylacetonate salts. Other compounds used were titanium stearate, germanium tetraphenyl, diphenyl lead diacetate, arsenic triphenyl, strontium salicylate, triphenyl antimony oxide, and mercury cyclohexanebutyrate. The ingredients were stirred in flasks using a magnetic stirrer for at least five days. Then, each flask was tilted and rotated for at least three days to insure that the polymer and organometallic compounds were thoroughly mixed.

A motor driven plate below a fixed blade was used to cast the solutions into 15 x 35 cm sheets. Depending upon which film was being cast, the height of the blade was set between 230 and 500 μm . The casting speed was set at 48 cm/min. Each film was separated from the casting plate and allowed to dry for several hours in a clean room. The films were further dried for 10 to 12 days in a vacuum chamber to remove the last traces of solvent. Films were weighed periodically to ascertain that their masses had stabilized.

After reaching constant mass, the films were cut into 36 and 46 mm dia. circular discs using stainless steel punches. About 100 discs of each film type were made. Each disc was weighed to $\pm 1 \mu\text{g}$ and stored in a petri dish. A ^{210}Po radioactive source was used to eliminate static charge before each mass measurement. Representative disc diameters were determined by using a microdensitometer. For each disc type the standard deviations in diameter ranged from 0.01 to 0.02 mm. Further details on the preparation are given by Dzubay et al. (1981).

RESULTS

Properties

The average total mass per unit area and calculated elemental concentration for each film type is shown in Table I. The data on mass per unit area are based upon the measured disc masses and diameters. The calculated elemental concentrations are based on the measured masses of polymer and organometallic compounds in the films and on an assumed 100% purity and known stoichiometry for the organometallic compounds.

Table I also shows the X-ray attenuation factor A calculated by the expression

$$A = (1 - e^{-x}) / x \quad (1)$$

where

$$x = M (\mu_1 \sec \theta_1 + \mu_2 \sec \theta_2) / (\pi r^2). \quad (2)$$

Here M is the mass of a disc, r is its radius, μ_1 is the mass absorption coefficient for incident X-rays, and θ_1 is the angle between the path of the incident X-rays and the line normal to the film. The corresponding quantities for outgoing X-rays are μ_2 and θ_2 . The exciting X-ray energy was assumed to be 18 keV for all elements except zirconium, cadmium, antimony, and barium for which it was assumed to be 40 keV. The angles used were $\theta_1 = 35^\circ$ and $\theta_2 = 25^\circ$. Values in Table 1 are shown for K_α and L_α characteristic X-rays.

Precision

Table II shows the uniformity from sample to sample for each polymer film type. The coefficient of variation in mass per area is a direct measure of the degree of thickness uniformity among discs. The values range from 4.2% to 6.4%. A more important parameter is the uniformity of dispersion of organometallic compounds in the films. This was determined by EDXRF analysis on 25 randomly selected 36 mm dia. discs of each film type. The spectrometer used a pulsed X-ray tube and secondary targets of molybdenum and samarium (Goulding et al. 1978). The analyses were done at an Environmental Protection Agency laboratory in Research Triangle Park, N. C. (EPA-NSI), and the results

are shown in Table II. Similar EDXRF measurements were made on sets of 14 discs from each film type by Columbia Scientific Industries (CSI), and the results are also listed in Table II. In each case the characteristic x-rays measured were L_{α} for mercury and lead and K_{α} for the rest of the elements.

The data on elemental concentrations in Table II represent the combined precision of the XRF measurements and the uniformity of the discs. The precision of the XRF measurements is about 0.5%. Thus, we conclude that, for eight of the ten film types, the coefficient of variation for elemental concentrations is about 1%. For the film containing chromium and copper, the coefficient is about 2%. These films were cast on three separate days, and the flask was not stirred overnight between days of casting. For films cast on the first day, the coefficient of variation is less than 1%. Perhaps if the flask had been stirred overnight between casting days, the entire batch would have been more uniform. The 4% nonuniformity for mercury may be due to its lack of stability, which is described below.

Stability

Because the organometallic compounds have finite vapor pressure at room temperature, it was necessary to test the stability of the metals in the polymer films. Two discs of each film type were stored in a freezer at -18°C , and four of each type were stored at room temperature ($22 \pm 3^{\circ}\text{C}$). Also stored in the freezer were a pair of vapor deposited metal films obtained from

Micromatter Co., Seattle, WA* for each element except zirconium. These films and deposits were analyzed by EDXRF in October, 1978, and the measurements were repeated 23 months later. Of the elements tested, only mercury showed any significant loss. For the polymer films stored at room temperature the loss rate for mercury was about 8% per year; no mercury loss was detected in the films stored in a freezer. For the other elements, the loss rate in the polymer films stored in a freezer and those stored at room temperature was less than 0.5% per year compared to the vapor deposited metal films.

The polymer films were also tested for stability in high radiation fluxes in a WDXRF spectrometer. Films were placed 2.5 cm from the exit window of the spectrometer's chromium anode x-ray tube, which was operated at a potential of 56.5 kV and a current of 18 mA. Six hours of exposure caused the films to become brittle and vulnerable to breakage. Films mounted in a rigid holder did not break until exposure time exceeded 47 hours. No loss of the calibration metals was detected before the films broke. Such results indicate that the films are suitable for WDXRF spectrometers provided that the radiation exposure time does not exceed six hours. In EDXRF spectrometers the radiation flux is usually so low that there is no limit on the exposure time.

* Mention of commercial products or company names does not constitute endorsement or recommendation by the U. S. Environmental Protection Agency.

Polymer Films as XRF Standards

To use the polymer films as standards for an XRF spectrometer, one needs to know the mass per unit area m of each metal in each film. This can be calculated by the expression:

$$m = fM/(\pi r^2) \quad (3)$$

where f is the average metal concentration in each film type, M is the disc mass, and r is its radius. Using the measured mass of each disc to calculate m for each disc, we find, as Table II (fourth and fifth columns) indicates, that the standards have a precision of about 1%.

A necessary, final step in using the polymer films as thin standards is to correct for X-ray attenuation. This is accomplished by defining a thin standard, having no X-ray attenuation and having metal mass per unit area m' , by the expression

$$m' = mA \quad (4)$$

where A is computed from Equation (1), and m is computed from Equation (3).

Accuracy

According to Equation (3) the numerical value m assigned to each polymer film disc is determined by the parameters f , M , and r . The accuracy for determining M and r is better than 0.3%, but the accuracy of f was not well defined. The values of f listed in Table I are based upon weighed amounts of organometallic compounds, which are assumed to be 100% pure and of known stoichiometry. The supplier suggests that the purities of the compounds are usually above 99% and are always above 95%, but those values are not certified. Thus, independent determination of the values of f was necessary.

Eight analytical laboratories were selected to perform independent determinations of the values of the metal concentrations in the polymer films. One laboratory used instrumental neutron activation analysis (INAA), one used optical spectroscopy (OS), one used WDXRF, and five used EDXRF. Table 3 summarizes the instruments, calibration standards and references to further information about the method used by each laboratory.

Samples were digested for the optical spectroscopic measurements. A mixture of sulfuric and nitric acids was used for titanium, chromium, manganese, nickel, copper, zinc, arsenic, cadmium, mercury and lead. A mixture of nitric acid and hydrogen peroxide was used to digest vanadium, iron, cobalt, germanium, rhodium, strontium, zirconium, antimony and barium. Flame atomic absorption with an acetylene-nitrous oxide carrier was used to determine titanium, vanadium, germanium and zirconium. The same method but with an acetylene-air carrier was used to determine chromium, manganese, iron, cobalt, nickel, copper, zinc, strontium, cadmium, antimony and lead. Flame

photometry was used to determine rubidium and barium. Emission spectrometry in an argon plasma was used to determine arsenic and mercury. Data on zirconium and arsenic are not reported due to high detection limit for the former and loss during digestion for the latter.

Table IV shows the results of the analyses. For six of the laboratories, the tabulated results are averages for two replicate discs of each type. The CSI results are averages based upon 14 replicate discs of each type; the EPA-NSI averages are based upon 26 replicate discs of each type. To ensure that the results from seven of the laboratories were independent, the data were handled by personnel from the EPA-NSI laboratory in a manner that prevented any of the other seven laboratories from having prior knowledge of any results on the elemental concentrations. Furthermore, the EPA-NSI data are based upon a calibration procedure that was not influenced by results on the polymer films. After the data were exchanged, the participants were given an opportunity to revise their numbers if new calibration procedures were being used. This resulted in only four changes, which are indicated in Table IV.

Table IV also shows the mean and standard deviation of the results for f from the eight laboratories. The coefficient of variation (standard deviation as a percent of the mean) is typically 10% and ranges from 6% to 24%. Such variation is large compared with the 1% precision of the parameter f , which is indicated in Table II. Moreover, for the six laboratories that received only two discs of each type to analyze, the deviation between pairs of results was typically 0.5% to 3%. Thus, we conclude that the variations among the results shown in Table IV are due primarily to inaccuracy in the measurements and are not due to imprecision in the measurements or to variations among polymer film discs.

Table V shows a comparison of the means of the measured elemental concentrations and values calculated from the stoichiometry of the organometallic compounds in the polymer films. Also shown are estimates of the uncertainties of the measured means, represented as $s/\sqrt{N}$ where s is the standard deviation for each element shown in Table IV, and N is the number of laboratories reporting data. The uncertainties as percentages of the measured means range from 2% to 9%, and the median value is 3%. The differences between the measured means and calculated values range from 0 to 31% and the median difference is 5%. In a future publication we will refine the elemental concentration values by requiring that the X-ray count rate per unit mass of standard element varies with atomic number in a predictable manner based upon known atomic weights, detector efficiency, and atomic number dependence of the cross sections for interactions between X-rays and atoms (Dzubay et al., 1981).

CONCLUSIONS

Thin polymer films have been developed to serve as standards for XRF spectrometers. The standards consist of nine types of polymer film that contain noninterfering pairs of the following 18 elements: titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, germanium, arsenic, rubidium, strontium, zirconium, cadmium, antimony, barium, and lead. The films have been cut into discs of known area, and their masses have been measured.

The mass of metal per unit mass of each disc was found to have a typical precision of about 1%. The elemental concentrations in the standards were analyzed by eight independent laboratories, and the resulting mean values have

uncertainties ranging from 2% to 9% with a median of 3%. Thus, we conclude that when the mean of the laboratory determinations are used to represent the elemental concentrations, the accuracy of the standards for XRF spectrometer calibration ranges from 2% to 9%, depending on the element, and is typically 3%. From a 23 month study of stability, it is found that the elemental concentrations are stable to better than 1% per year for films stored at -18° C and $+22^{\circ}$ C. An attempt to make a standard for mercury was unsuccessful because, though stable at -18° C, it lost mercury at a rate of 8% per year when stored at 20° C.

Study of both stability and accuracy is continuing. Although the films not containing mercury appear to be stable, it is recommended that polymer films be stored in a freezer as a precaution. When polymer film standards are used in WDXRF spectrometers, radiation damage will be slight only if the total time of radiation exposure does not exceed six hours. In most EDXRF spectrometers the radiation flux is so low that no limit needs to be placed on the exposure time. It is not yet known if the polymer films are sufficiently rugged to withstand intense heating that can be produced in particle induced X-ray emission analysis (Shaw and Willis, 1978).

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Table I. Properties of the Polymer Films

Film Type	Polymer	Mean Mass per unit area mg/cm ²	Element	Calculated Elemental Concentration mg/g	Attenuation ^a Factor A	
					K _{α}	L _{α}
1	CAB ^b	2.32	Ti	1.00	0.95	
			Ge	2.52	0.994	
2	CAP ^c	2.50	V	2.50	0.96	
			Ni	2.44	0.986	
3	CAP	3.16	Cr	2.50	0.96	
			Cu	2.50	0.986	
4	CAP	3.31	Mn	2.47	0.96	
			Zn	2.50	0.987	
5	CAP	2.89	Fe	2.51	0.975	
			Pb	2.51		0.993
6	CAB	3.12	Co	2.50	0.979	
			Rb	2.51	0.996	
7	CAP	3.26	As	1.48	0.993	
			Ba	1.49	0.999	0.92
8	CAP	3.07	Sr	1.48	0.996	
			Sb	1.48	0.999	0.87
9	CAP	3.25	Zr	2.43	0.997	
			Cd	2.45	0.999	0.80
10	CAP	3.15	Hg	1.51		0.992

^aThese values pertain only to the specific angles and excitation energies described in the text.

^bCellulose acetate butyrate.

^cCellulose acetate propionate.

Table II. Coefficients of Variation in Mass per Unit Area and in Elemental Concentration in Polymer Film Discs.

Film	Coefficient of Variation ^a , mass/area	Element	Coefficient of variation ^a , Elemental Concentration	
			EPA-NSI ^b	CSI ^c
1	5.2%	Ti	1.8%	0.7%
		Ge	1.1	1.2
2	6.4	V	1.6	1.2
		Ni	0.9	1.4
3	5.1	Cr	0.9 ^d , 1.7 ^e	2.0
		Cu	0.5 ^d , 2.2 ^e	1.2
4	4.8	Mn	1.0	0.9
		Zn	0.8	1.1
5	4.2	Fe	1.0	1.0
		Pb	1.0	1.1
6	5.4	Ca	1.2	1.3
		Rb	0.8	1.2
7	4.6	As	1.0	1.0
		Ba	1.0	1.5
8	4.6	Sr	0.6	1.2
		Sb	1.4	1.1
9	5.8	Zr	1.0	1.3
		Cd	1.2	1.0
10	4.8	Hg	4.1	4.3

^aThe coefficient of variation is 100 times the ratio of standard deviation to mean.

^bBased upon x-ray fluorescence analysis of 26 randomly selected samples.

^cBased upon x-ray fluorescence analysis of 14 randomly selected samples.

^dFilms cast on first day only. See text.

^eAll films cast during a three day period.

Table III. Summary of Analytical Methods and Standards Used in Analysis of Polymer Films.

Method	Instrument	Laboratory	Lab Code	Standards	References
INAA	NBS Reactor	University of Maryland	UND	Pure metal standards and multielement standards prepared by solution evaporation on filter paper	Germani, et al., 1980
OS	See text	National Bureau of Standards	NBS	Known solutions prepared from pure metals	
WDXRF	Siemens NRS-3	Environmental Protection Agency	EPA-NSI	Vapor deposited metal films from Micrometer Co.	Wagman et al., 1977
EDXRF	CSI Model 110	Columbia Scientific Industries	CSI	Evaporated solution deposits made by CSI	Rhodes, 1973
EDXRF	Pulsed x-ray tube with secondary targets	Lawrence Berkeley Laboratory	LBL	Aerosol deposits containing metals paired with copper in known ratios and 5 Micromatter standards for copper	Jaklevic et al., 1980
EDXRF	ND 4410 System with EPPLEX detector and Cd exciter	Lawrence Livermore Laboratory	LLL	Dried single element solution deposits on Whatman 41 and Micromatter metal film standards	
EDXRF	Pulsed x-ray tube with secondary targets	Environmental Protection Agency and Northrop Services, Inc.	EPA-NSI	Vapor deposited metal films	Dzubyak & Rickel, 1978.
EDXRF	ORTEC Tefu 111	NEA Laboratories, Inc.	NEA	Vapor deposited metal films from Micromatter Co. & evaporated solution deposits from CSI, all modified by theory	Drane, et al. 198

Table IV. Measured Elemental Concentrations f Expressed in Units of mg per g. The top row of column headings represents method abbreviations; the second row represents laboratory abbreviations.

Film Type	Element	NAA		OS		WDXRF		EDXRF				Mean	s	
		UNO		NBS		EPA		CSI	LBL	LLL	EPA-NSI			NEA
1	Ti	0.98		1.08		1.08		1.19	0.94	0.94	1.09	1.10	1.05	0.09
	Ge	3.10		2.0				2.77	2.86	2.38	2.64	2.82	2.65	0.36
2	V	2.44		2.31		2.8 ^a		2.90 ^a	2.96	2.66	2.81	3.10	2.75	0.27
	Ni	2.17		2.43		2.2		2.42	2.54	2.06	2.54	2.76	2.39	0.23
3	Cr	2.62		2.67		2.5		2.98	2.71	2.44	2.51	2.74	2.65	0.17
	Cu	2.72		2.37		2.3		2.61	2.70	2.24	2.42	2.54	2.49	0.18
4	Mn	2.68		2.53		2.8		2.95	2.80	2.44	2.55	2.81	2.70	0.17
	Zn	2.56		2.52		2.35		2.48	2.74	2.27	2.48	2.64	2.51	0.15
5	Fe	2.60		3.34		2.55		2.77	2.79	2.44	2.55	2.80	2.73	0.28
	Pb			2.25		2.5		2.76	2.89	2.74	2.65	2.70	2.64	0.21
6	Co	2.20		2.49		2.2		2.66 ^b	2.41	2.17 ^a	2.25	2.47	2.36	0.18
	Rb	2.68		1.91				2.58 ^b	2.62	2.28	2.38	2.56	2.43	0.27
7	As	2.15				1.9		1.64	1.69	1.40	1.60	1.64	1.72	0.24
	Ba	1.56		1.55		1.34		1.47	1.65		1.51	1.60	1.53	0.10
8	Sr	1.43		1.59				1.57	1.76	1.48	1.44	1.62	1.56	0.12
	Sb	1.62		0.76		1.60		1.67	1.90		1.72	1.72	1.57	0.37
9	Zr	3.10						3.15	3.86	3.14		3.38	3.33	0.32
	Cd	2.40		2.56		2.66		3.14	3.14		2.86	3.06	2.83	0.30
10	Hg			1.11		3.4 ^c		1.33	1.18	1.35	1.28		1.25	0.10

^aChanged from an initial value, which was invalid due to use of an inaccurate standard.

^bChanged from an invalid initial value because of a calculational error.

^cNot included in calculating the mean and standard deviation.

Table V. Comparison of Elemental Concentration Determinations for Polymer Films. Results are expressed in mg per g.

Film	Element	Calculated $\bar{f}$	Laboratory Analysis		
			N	Mean $\bar{f}$	($s/\sqrt{N}$)
1	Ti	1.00	8	1.05	(0.03)
	Ge	2.52	7	2.65	(0.14)
2	V	2.50	8	2.75	(0.10)
	Ni	2.44	8	2.39	(0.08)
3	Cr	2.50	8	2.65	(0.07)
	Cu	2.50	8	2.49	(0.06)
4	Mn	2.47	8	2.70	(0.06)
	Zn	2.50	8	2.51	(0.05)
5	Fe	2.51	8	2.73	(0.10)
	Pb	2.51	7	2.64	(0.08)
6	Co	2.50	8	2.36	(0.06)
	Rb	2.51	7	2.43	(0.10)
7	As	1.48	7	1.72	(0.09)
	Ba	1.49	7	1.53	(0.04)
8	Sr	1.48	7	1.56	(0.05)
	Sb	1.48	7	1.57	(0.14)
9	Zr	2.43	5	3.33	(0.1)
	Cd	2.45	7	2.83	(0.1)

Appendix L

CMB Results Multiday Samples
Spring, 1982
Reservoir Site

CMBDER RESULTS FOR CMB # HD566

FINE PARTICULATE FRACTION

SAMPLING DATE: 820303 SITE CODE: 20

SAMPLING DURATION: 139 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 4.909 D OF F: 4

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.053+-	0.023	0.808+-	0.359
4	GEO-B	*	1.022+-	0.078	15.672+-	1.998
65	DRBLD	*	0.015+-	0.005	0.234+-	0.080
68	MSSTK	*	0.110+-	0.034	1.685+-	0.543
69	ZHSTK	*	0.055+-	0.011	0.847+-	0.187
70	BGSTK	*	0.030+-	0.011	0.455+-	0.168
74	CUKST	*	0.011+-	0.002	0.161+-	0.039
77	SECSO	*	2.628+-	0.409	40.277+-	7.495

TOTAL:			3.923+-	0.419	60.139+-	8.877
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.141+-	0.016	2.160	0.098+-	0.010	0.693+-0.083 AL
2 SI *	0.214+-	0.024	3.274	0.312+-	0.031	1.462+-0.255 SI
3 P	0.029+-	0.003	0.448	0.003+-	0.000	0.115+-0.008 P
4 S *	0.667+-	0.076	10.226	0.667+-	0.064	1.000+-0.135 S
5 CL	<	0.003	---	0.007+-	0.001	9.999+-9.999 CL
6 K *	0.038+-	0.005	0.587	0.024+-	0.002	0.621+-0.067 K
7 CA *	0.105+-	0.012	1.609	0.109+-	0.010	1.034+-0.143 CA
8 TI	0.003+-	0.000	0.044	0.003+-	0.000	1.165+-0.168 TI
9 Y	0.000+-	0.000	0.001	0.000+-	0.000	2.098+-0.939 Y
10 CR	0.001+-	0.000	0.011	0.000+-	0.000	0.298+-0.050 CR
11 MH	0.001+-	0.000	0.015	0.001+-	0.000	1.078+-0.166 MH
12 FE *	0.032+-	0.004	0.492	0.033+-	0.003	1.023+-0.120 FE
13 NI	0.001+-	0.000	0.011	0.000+-	0.000	0.375+-0.054 NI
14 CU *	0.008+-	0.001	0.118	0.008+-	0.001	1.000+-0.109 CU
15 ZN *	0.040+-	0.005	0.607	0.040+-	0.003	1.003+-0.108 ZN
16 AS *	0.016+-	0.002	0.247	0.016+-	0.001	1.000+-0.092 AS
17 SE	0.000+-	0.000	0.006	0.000+-	0.000	0.443+-0.099 SE
18 BR *	0.004+-	0.001	0.055	0.004+-	0.001	1.003+-0.540 BR
19 SR	0.001+-	0.000	0.011	0.000+-	0.000	0.557+-0.075 SR
20 PD	<	0.001	---	0.001+-	0.000	0.000+-0.000 PD
21 AG	<	0.001	---	0.001+-	0.000	0.000+-0.000 AG
22 CD *	0.009+-	0.002	0.133	0.009+-	0.001	1.026+-0.122 CD
23 IN	<	0.001	---	0.000+-	0.000	0.000+-0.000 IN
24 SN	<	0.002	---	0.001+-	0.000	0.808+-0.226 SN
25 SB	0.006+-	0.004	0.097	0.004+-	0.001	0.580+-0.092 SB
26 BA	<	0.008	---	0.003+-	0.001	0.000+-0.000 BA
27 HG	<	0.000	---	0.000+-	0.000	0.000+-0.000 HG
28 PB *	0.053+-	0.006	0.811	0.053+-	0.004	1.003+-0.094 PB

MEAS. AMB. MASS (UG/M3): 6.5

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HD565

COARSE PARTICULATE FRACTION

SAMPLING DATE: 820303 SITE CODE: 20

SAMPLING DURATION: 139 HRS.

SITE: RESERYDIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.604 D OF F: 6

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.007+-	0.006	0.122+-	0.091
4	GEO-B	*	3.072+-	0.287	50.314+-	7.397
26	LIME	*	1.753+-	0.385	28.717+-	7.100
47	SLAGM	*	0.030+-	0.064	1.481+-	1.058
68	MSSTK	*	0.266+-	0.045	4.359+-	0.887
69	ZHSTK	*	0.032+-	0.013	0.524+-	0.214
74	CUKST	*	0.030+-	0.006	0.494+-	0.118

TOTAL:		5.251+-	0.487	86.011+-	12.601
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SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.180+-	0.022	2.953	0.186+-	0.016	1.033+-0.129 AL
2 SI *	0.616+-	0.071	10.094	0.725+-	0.065	1.177+-0.163 SI
3 P	0.009+-	0.002	0.152	0.005+-	0.001	0.585+-0.084 P
4 S	0.191+-	0.031	3.122	0.065+-	0.007	0.344+-0.036 S
5 CL	0.013+-	0.002	0.213	0.016+-	0.001	1.198+-0.124 CL
6 K *	0.069+-	0.008	1.138	0.061+-	0.006	0.878+-0.107 K
7 CA *	0.798+-	0.091	13.074	0.790+-	0.058	0.990+-0.102 CA
8 TI *	0.011+-	0.001	0.174	0.010+-	0.001	0.959+-0.111 TI
9 V	0.001+-	0.000	0.011	0.001+-	0.000	0.881+-0.101 V
10 CR	0.001+-	0.000	0.021	0.001+-	0.000	0.524+-0.047 CR
11 MH *	0.004+-	0.000	0.064	0.004+-	0.000	1.085+-0.122 MH
12 FE *	0.125+-	0.015	2.054	0.108+-	0.007	0.862+-0.076 FE
13 NI	0.001+-	0.000	0.013	0.001+-	0.000	0.662+-0.087 NI
14 CU *	0.023+-	0.003	0.380	0.023+-	0.002	1.000+-0.110 CU
15 ZN *	0.042+-	0.005	0.688	0.042+-	0.003	1.000+-0.098 ZN
16 AS *	0.009+-	0.002	0.141	0.009+-	0.001	0.998+-0.188 AS
17 SE	0.000+-	0.000	0.003	0.000+-	0.000	1.358+-0.431 SE
18 BR *	0.001+-	0.000	0.013	0.001+-	0.000	0.994+-0.346 BR
19 SR	0.003+-	0.000	0.043	0.001+-	0.000	0.562+-0.052 SR
20 PD	<	0.001	---	0.000+-	0.000	0.686+-0.534 PD
21 AG	<	0.001	---	0.001+-	0.000	1.074+-0.552 AG
22 CD *	0.004+-	0.002	0.062	0.003+-	0.001	0.875+-0.190 CD
23 IN	<	0.001	---	0.000+-	0.000	0.000+-0.000 IN
24 SH	0.002+-	0.002	0.034	0.001+-	0.000	0.311+-0.179 SH
25 SB	0.004+-	0.003	0.066	0.005+-	0.001	1.129+-0.349 SB
26 BA	0.009+-	0.008	0.152	0.001+-	0.002	0.156+-0.187 BA
27 HG	<	0.000	---	0.000+-	0.000	4.733+-4.587 HG
28 PB *	0.079+-	0.010	1.301	0.081+-	0.010	1.025+-0.180 PB

MEAS. AMB. MASS (UG/M3): 6.1

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HT440

TOTAL PARTICULATE FRACTION

SAMPLING DATE: 820303 SITE CODE: 20

SAMPLING DURATION: 137 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.838 D OF F: 5

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.041+-	0.017	0.333+-	0.144
4	GEO-B	*	4.684+-	0.401	38.021+-	5.062
26	LIME	*	2.019+-	0.512	16.388+-	4.480
47	SLAGM	*	0.127+-	0.061	1.030+-	0.503
68	MSSTK	*	0.222+-	0.039	1.803+-	0.367
69	ZHSTK	*	0.047+-	0.016	0.380+-	0.135
70	BGSTK	*	0.010+-	0.010	0.084+-	0.081
74	CUKST	*	0.036+-	0.007	0.294+-	0.064

TOTAL: 7.187+- 0.655 58.333+- 7.976

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.321+-	0.036	2.609	0.292+-	0.027	0.908+-0.112 AL
2 SI *	1.061+-	0.119	8.614	1.183+-	0.110	1.115+-0.156 SI
3 P	0.027+-	0.003	0.218	0.007+-	0.001	0.253+-0.030 P
4 S	0.576+-	0.066	4.673	0.075+-	0.004	0.130+-0.007 S
5 CL	0.012+-	0.003	0.096	0.022+-	0.001	1.885+-0.253 CL
6 K *	0.118+-	0.014	0.959	0.097+-	0.009	0.819+-0.100 K
7 CA *	1.037+-	0.116	8.418	1.029+-	0.072	0.992+-0.098 CA
8 TI *	0.013+-	0.002	0.106	0.015+-	0.001	1.173+-0.162 TI
9 V	0.001+-	0.000	0.006	0.001+-	0.000	1.064+-0.134 V
10 CR	0.001+-	0.000	0.007	0.001+-	0.000	1.092+-0.114 CR
11 MN *	0.006+-	0.001	0.045	0.006+-	0.000	1.010+-0.086 MN
12 FE *	0.165+-	0.019	1.339	0.161+-	0.012	0.976+-0.098 FE
13 HI	0.001+-	0.000	0.007	0.001+-	0.000	0.726+-0.050 HI
14 CU *	0.026+-	0.003	0.214	0.026+-	0.002	1.000+-0.107 CU
15 ZN *	0.053+-	0.006	0.433	0.053+-	0.003	1.000+-0.080 ZN
16 AS *	0.011+-	0.002	0.090	0.012+-	0.001	1.085+-0.134 AS
17 SE	0.000+-	0.000	0.003	0.000+-	0.000	0.836+-0.088 SE
18 BR *	0.003+-	0.000	0.024	0.003+-	0.001	1.034+-0.512 BR
19 SR	0.003+-	0.000	0.027	0.002+-	0.000	0.539+-0.032 SR
20 PD	<	0.001	---	0.000+-	0.000	0.380+-0.170 PD
21 AG	0.003+-	0.001	0.022	0.001+-	0.000	0.263+-0.054 AG
22 CD *	0.006+-	0.002	0.049	0.006+-	0.000	1.018+-0.098 CD
23 IN	<	0.001	---	0.000+-	0.000	0.048+-0.146 IN
24 SN	<	0.002	---	0.001+-	0.000	0.000+-0.000 SN
25 SB	0.007+-	0.004	0.054	0.006+-	0.001	0.842+-0.107 SB
26 BA	<	0.009	---	0.001+-	0.001	0.000+-0.000 BA
27 HG	0.000+-	0.000	0.003	0.001+-	0.000	1.383+-0.288 HG
28 PB *	0.089+-	0.010	0.726	0.085+-	0.006	0.951+-0.095 PB

MEAS. AMB. MASS (UG/M3): 12.3

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HT438

TOTAL PARTICULATE FRACTION

SAMPLING DATE: 820309 SITE CODE: 20

SAMPLING DURATION: 140 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.480 D OF F: 6

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.048+-	0.020	0.347+-	0.153
4	GEO-B	*	5.805+-	0.441	42.127+-	5.355
26	LIME	*	2.072+-	0.570	15.032+-	4.414
65	DRBLD	*	0.041+-	0.019	0.299+-	0.141
68	MSSTK	*	0.236+-	0.054	1.713+-	0.428
69	ZHSTK	*	0.077+-	0.016	0.557+-	0.131
70	BGSTK	*	0.032+-	0.013	0.233+-	0.096

TOTAL: 8.311+- 0.724 60.308+- 8.087

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.371+-	0.042	2.695	0.353+-	0.033	0.950+-0.122 AL
2 SI *	1.283+-	0.144	9.307	1.434+-	0.137	1.118+-0.160 SI
3 P	0.034+-	0.004	0.245	0.008+-	0.001	0.235+-0.026 P
4 S	0.354+-	0.041	2.567	0.081+-	0.005	0.229+-0.013 S
5 CL	0.034+-	0.005	0.246	0.025+-	0.002	0.750+-0.059 CL
6 K *	0.168+-	0.019	1.219	0.119+-	0.011	0.707+-0.083 K
7 CA *	1.147+-	0.129	8.327	1.136+-	0.080	0.990+-0.098 CA
8 TI *	0.014+-	0.002	0.104	0.018+-	0.002	1.276+-0.191 TI
9 Y	0.000+-	0.000	0.004	0.001+-	0.000	1.933+-0.390 Y
10 CR	0.001+-	0.000	0.009	0.001+-	0.000	0.782+-0.081 CR
11 MH *	0.005+-	0.001	0.035	0.005+-	0.000	0.988+-0.105 MH
12 FE *	0.168+-	0.019	1.220	0.162+-	0.014	0.963+-0.114 FE
13 NI	0.000+-	0.000	0.004	0.001+-	0.000	1.321+-0.130 NI
14 CU *	0.008+-	0.001	0.057	0.007+-	0.000	0.909+-0.075 CU
15 ZH *	0.064+-	0.007	0.462	0.063+-	0.004	0.997+-0.098 ZH
16 AS *	0.023+-	0.003	0.165	0.023+-	0.002	1.030+-0.104 AS
17 SE	0.000+-	0.000	0.002	0.000+-	0.000	1.325+-0.161 SE
18 BR *	0.004+-	0.000	0.027	0.004+-	0.001	0.964+-0.466 BR
19 SR	0.004+-	0.000	0.028	0.002+-	0.000	0.454+-0.029 SR
20 PD	0.001+-	0.001	0.010	0.001+-	0.000	0.547+-0.114 PD
21 AG	0.001+-	0.001	0.003	0.001+-	0.000	1.095+-0.267 AG
22 CD *	0.012+-	0.003	0.088	0.012+-	0.001	0.980+-0.096 CD
23 IN	0.003+-	0.002	0.019	0.000+-	0.000	0.067+-0.095 IN
24 SH	< 0.002	---	---	0.002+-	0.000	1.538+-0.413 SH
25 SB	0.005+-	0.004	0.037	0.007+-	0.001	1.409+-0.217 SB
26 BA	< 0.010	---	---	0.001+-	0.001	0.147+-0.239 BA
27 HG	0.001+-	0.000	0.005	0.001+-	0.000	0.924+-0.151 HG
28 PB *	0.096+-	0.011	0.697	0.101+-	0.007	1.056+-0.101 PB

MEAS. AMB. MASS (UG/M3): 13.8

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HT438

TOTAL PARTICULATE FRACTION

SAMPLING DATE: 820309 SITE CODE: 20

SAMPLING DURATION: 140 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.669 D OF F: 5

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.046+-	0.020	0.336+-	0.149
4	GEO-B	*	5.334+-	0.467	38.706+-	5.203
26	LIME	*	2.225+-	0.574	16.144+-	4.476
65	DRBLD	*	0.038+-	0.019	0.279+-	0.141
68	MSSTK	*	0.247+-	0.054	1.791+-	0.433
69	ZNSTK	*	0.073+-	0.016	0.529+-	0.130
70	BGSTK	*	0.031+-	0.013	0.227+-	0.096
79	WSTOV	*	1.796+-	0.739	13.035+-	5.528

TOTAL:			9.791+-	1.048	71.046+-	10.504
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.371+-	0.042	2.695	0.332+-	0.030	0.894+-0.109 AL
2 SI *	1.283+-	0.144	9.307	1.332+-	0.126	1.038+-0.141 SI
3 P	0.034+-	0.004	0.245	0.010+-	0.001	0.295+-0.027 P
4 S	0.354+-	0.041	2.567	0.097+-	0.005	0.273+-0.014 S
5 CL	0.034+-	0.005	0.246	0.030+-	0.002	0.892+-0.063 CL
6 K *	0.168+-	0.019	1.219	0.168+-	0.011	1.000+-0.091 K
7 CA *	1.147+-	0.129	8.327	1.157+-	0.080	1.008+-0.100 CA
8 TI *	0.014+-	0.002	0.104	0.017+-	0.002	1.196+-0.169 TI
9 V	0.000+-	0.000	0.004	0.001+-	0.000	1.841+-0.356 V
10 CR	0.001+-	0.000	0.009	0.001+-	0.000	0.738+-0.076 CR
11 MH *	0.005+-	0.001	0.035	0.005+-	0.000	0.977+-0.099 MH
12 FE *	0.168+-	0.019	1.220	0.152+-	0.013	0.906+-0.102 FE
13 NI	0.000+-	0.000	0.004	0.001+-	0.000	1.331+-0.145 NI
14 CU *	0.008+-	0.001	0.057	0.007+-	0.000	0.906+-0.076 CU
15 ZH *	0.064+-	0.007	0.462	0.063+-	0.004	0.995+-0.093 ZH
16 AS *	0.023+-	0.003	0.165	0.023+-	0.002	1.030+-0.102 AS
17 SE	0.000+-	0.000	0.002	0.000+-	0.000	1.340+-0.196 SE
18 BR *	0.004+-	0.000	0.027	0.004+-	0.001	0.957+-0.451 BR
19 SR	0.004+-	0.000	0.028	0.002+-	0.000	0.481+-0.030 SR
20 PD	0.001+-	0.001	0.010	0.001+-	0.000	0.553+-0.112 PD
21 AG	0.001+-	0.001	0.003	0.001+-	0.000	1.105+-0.279 AG
22 CD *	0.012+-	0.003	0.088	0.012+-	0.001	0.969+-0.094 CD
23 IN	0.003+-	0.002	0.019	0.000+-	0.000	0.078+-0.096 IN
24 SH	<	0.002	---	0.002+-	0.000	1.485+-0.415 SH
25 SB	0.005+-	0.004	0.037	0.007+-	0.001	1.408+-0.225 SB
26 BA	<	0.010	---	0.001+-	0.001	0.144+-0.246 BA
27 HG	0.001+-	0.000	0.005	0.001+-	0.000	0.932+-0.153 HG
28 PB *	0.096+-	0.011	0.697	0.103+-	0.007	1.069+-0.105 PB

MEAS. AMB. MASS (UG/M3): 13.8

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HD564

FINE PARTICULATE FRACTION

SAMPLING DATE: 820315 SITE CODE: 20

SAMPLING DURATION: 127 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 22.189 D OF F: 4

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.111+-	0.041	1.520+-	0.581
4	GEO-B	*	0.334+-	0.034	4.563+-	0.654
65	DRBLD	*	0.022+-	0.006	0.305+-	0.084
68	MSSTK	*	0.123+-	0.034	1.678+-	0.493
69	ZNSTK	*	0.109+-	0.018	1.495+-	0.287
70	BGSTK	*	0.019+-	0.006	0.255+-	0.085
74	CUKST	*	0.004+-	0.002	0.054+-	0.021
77	SECSO	*	3.133+-	0.482	42.836+-	7.912

TOTAL:			3.855+-	0.487	52.707+-	8.556
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.061+-	0.007	0.831	0.034+-	0.003	0.552+-0.059 AL
2 SI *	0.097+-	0.011	1.333	0.107+-	0.010	1.096+-0.154 SI
3 P	0.033+-	0.004	0.450	0.002+-	0.000	0.062+-0.004 P
4 S *	0.789+-	0.089	10.791	0.789+-	0.076	1.000+-0.136 S
5 CL	0.021+-	0.003	0.282	0.006+-	0.001	0.296+-0.046 CL
6 K *	0.149+-	0.017	2.036	0.009+-	0.001	0.064+-0.005 K
7 CA *	0.033+-	0.004	0.458	0.040+-	0.004	1.189+-0.165 CA
8 TI	0.001+-	0.000	0.016	0.001+-	0.000	1.072+-0.134 TI
9 Y	0.000+-	0.000	0.003	0.000+-	0.000	0.364+-0.175 Y
10 CR	0.000+-	0.000	0.001	0.000+-	0.000	1.217+-0.514 CR
11 MH	0.001+-	0.000	0.008	0.001+-	0.000	1.329+-0.331 MH
12 FE *	0.014+-	0.002	0.186	0.016+-	0.001	1.208+-0.131 FE
13 NI	0.000+-	0.000	0.005	0.000+-	0.000	0.834+-0.118 NI
14 CU *	0.004+-	0.001	0.060	0.004+-	0.000	1.000+-0.092 CU
15 ZH *	0.065+-	0.007	0.891	0.068+-	0.006	1.036+-0.130 ZH
16 AS *	0.021+-	0.002	0.288	0.021+-	0.001	1.003+-0.096 AS
17 SE	0.000+-	0.000	0.005	0.000+-	0.000	0.508+-0.101 SE
18 BR *	0.005+-	0.001	0.063	0.007+-	0.003	1.612+-1.192 BR
19 SR	0.000+-	0.000	0.004	0.000+-	0.000	1.023+-0.195 SR
20 PD	0.001+-	0.000	0.008	0.001+-	0.000	1.265+-0.197 PD
21 AG	0.001+-	0.001	0.012	0.001+-	0.000	0.655+-0.094 AG
22 CD *	0.006+-	0.001	0.083	0.006+-	0.000	1.061+-0.114 CD
23 IH	<	0.001	---	0.000+-	0.000	0.000+-0.000 IH
24 SH	0.001+-	0.001	0.015	0.001+-	0.000	1.175+-0.180 SH
25 SB	0.002+-	0.002	0.014	0.004+-	0.000	2.130+-0.423 SB
26 BA	<	0.005	---	0.001+-	0.000	0.000+-0.000 BA
27 HG	0.000+-	0.000	0.004	0.000+-	0.000	1.163+-0.223 HG
28 PB *	0.085+-	0.010	1.165	0.067+-	0.005	0.783+-0.073 PB

MEAS. AMB. MASS (UG/M3): 7.3

* - FITTING ELEMENT

CMRDEQ RESULTS FOR CMB # HD563
 COARSE PARTICULATE FRACTION
 SAMPLING DATE: 820315 SITE CODE: 20
 SAMPLING DURATION: 127 HRS.
 SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.227 D OF F: 6
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.011+-	0.005	0.270+-	0.137
4	GEO-B	*	2.698+-	0.234	68.822+-	10.273
26	LIME	*	0.178+-	0.152	4.539+-	3.916
47	SLAGM	*	0.087+-	0.050	2.224+-	1.305
68	MSSTK	*	0.190+-	0.032	4.840+-	1.004
69	ZHSTK	*	0.056+-	0.014	1.437+-	0.397
74	CUKST	*	0.018+-	0.004	0.450+-	0.114

TOTAL: 3.238+- 0.286 82.581+-12.399

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	0.145+- 0.017	3.696	0.147+- 0.014	1.015+-0.139 AL
2 SI *	0.513+- 0.058	13.082	0.590+- 0.057	1.151+-0.169 SI
3 P	0.009+- 0.001	0.227	0.004+- 0.000	0.505+-0.045 P
4 S	0.104+- 0.022	2.642	0.043+- 0.005	0.412+-0.048 S
5 CL	0.007+- 0.001	0.171	0.008+- 0.001	1.142+-0.135 CL
6 K *	0.047+- 0.007	1.189	0.052+- 0.005	1.109+-0.158 K
7 CA *	0.287+- 0.033	7.325	0.288+- 0.023	1.001+-0.111 CA
8 TI *	0.010+- 0.001	0.247	0.008+- 0.001	0.840+-0.100 TI
9 V	0.000+- 0.000	0.013	0.001+- 0.000	1.001+-0.124 V
10 CR	0.001+- 0.000	0.031	0.001+- 0.000	0.448+-0.038 CR
11 MH *	0.003+- 0.000	0.071	0.003+- 0.000	1.143+-0.134 MH
12 FE *	0.107+- 0.012	2.729	0.086+- 0.006	0.799+-0.073 FE
13 HI	0.001+- 0.000	0.018	0.000+- 0.000	0.612+-0.072 HI
14 CU *	0.015+- 0.002	0.375	0.015+- 0.001	1.000+-0.106 CU
15 ZH *	0.052+- 0.006	1.326	0.051+- 0.004	0.989+-0.100 ZH
16 AS *	0.006+- 0.001	0.148	0.007+- 0.001	1.152+-0.216 AS
17 SE	0.000+- 0.000	0.001	0.000+- 0.000	2.048+-0.784 SE
18 BR *	0.001+- 0.000	0.023	0.001+- 0.000	0.998+-0.433 BR
19 SR	0.002+- 0.000	0.041	0.001+- 0.000	0.586+-0.059 SR
20 PD	< 0.000	---	0.000+- 0.000	0.000+-0.000 PD
21 AG	0.000+- 0.000	0.006	0.000+- 0.000	0.950+-0.431 AG
22 CD *	0.003+- 0.001	0.089	0.002+- 0.000	0.677+-0.131 CD
23 IH	< 0.001	---	0.000+- 0.000	0.076+-0.229 IH
24 SH	< 0.001	---	0.001+- 0.000	1.207+-0.645 SH
25 SB	0.002+- 0.002	0.059	0.003+- 0.001	1.493+-0.502 SB
26 BA	< 0.004	---	0.001+- 0.001	0.000+-0.000 BA
27 HG	0.000+- 0.000	0.003	0.000+- 0.000	1.855+-0.722 HG
28 PB *	0.063+- 0.008	1.607	0.063+- 0.007	0.994+-0.160 PB

MEAS. AMB. MASS (UG/M3): 3.9

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HD528

FINE PARTICULATE FRACTION

SAMPLING DATE: 820320 SITE CODE: 20

SAMPLING DURATION: 51 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 19.498 D OF F: 4
CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.724+- 0.219	4.741+- 1.513
4	GEO-B	*	1.319+- 0.159	8.638+- 1.362
26	LIME	*	0.649+- 0.180	4.248+- 1.257
65	DRBLD	*	0.083+- 0.018	0.545+- 0.133
68	MSSTK	*	0.134+- 0.130	0.878+- 0.856
69	ZNSTK	*	0.258+- 0.042	1.687+- 0.325
70	BGSTK	*	0.038+- 0.015	0.251+- 0.101
77	SECSO	*	6.578+- 1.014	43.074+- 7.959

TOTAL:			9.783+- 1.073	64.064+- 9.596
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SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 AL *	0.211+- 0.024	1.382	0.143+- 0.013	0.680+-0.072	AL
2 SI *	0.384+- 0.043	2.515	0.454+- 0.040	1.182+-0.161	SI
3 P	0.080+- 0.009	0.527	0.005+- 0.000	0.068+-0.005	P
4 S *	1.653+- 0.186	10.823	1.653+- 0.160	1.000+-0.137	S
5 CL	< 0.006	---	0.022+- 0.003	3.928+-2.450	CL
6 K *	0.337+- 0.038	2.207	0.034+- 0.003	0.102+-0.009	K
7 CA *	0.356+- 0.040	2.334	0.345+- 0.024	0.967+-0.095	CA
8 TI *	0.004+- 0.001	0.029	0.005+- 0.000	1.126+-0.144	TI
9 V	0.001+- 0.000	0.005	0.000+- 0.000	0.464+-0.125	V
10 CR	0.001+- 0.000	0.007	0.000+- 0.000	0.349+-0.081	CR
11 MN	0.001+- 0.000	0.010	0.002+- 0.000	1.648+-0.513	MN
12 FE *	0.045+- 0.005	0.297	0.053+- 0.004	1.160+-0.132	FE
13 HI	0.001+- 0.000	0.005	0.001+- 0.000	1.316+-0.209	HI
14 CU	0.003+- 0.000	0.021	0.003+- 0.000	1.076+-0.136	CU
15 ZN *	0.152+- 0.017	0.995	0.155+- 0.014	1.022+-0.130	ZN
16 AS *	0.060+- 0.007	0.392	0.060+- 0.005	1.002+-0.115	AS
17 SE	0.001+- 0.000	0.007	0.000+- 0.000	0.350+-0.081	SE
18 BR *	0.012+- 0.001	0.082	0.048+- 0.019	3.820+-5.947	BR
19 SR	0.001+- 0.000	0.009	0.001+- 0.000	0.470+-0.074	SR
20 PD	0.001+- 0.001	0.003	0.002+- 0.000	2.740+-0.906	PD
21 AG	0.002+- 0.001	0.015	0.001+- 0.000	0.557+-0.133	AG
22 CD *	0.012+- 0.003	0.079	0.013+- 0.001	1.050+-0.122	CD
23 IH	< 0.002	---	0.000+- 0.000	0.000+-0.000	IN
24 SH	< 0.002	---	0.003+- 0.000	4.885+-4.138	SN
25 SB	< 0.005	---	0.009+- 0.001	0.000+-0.000	SB
26 BA	< 0.013	---	0.004+- 0.002	0.000+-0.000	BA
27 HG	0.001+- 0.000	0.007	0.001+- 0.000	0.583+-0.101	HG
28 PB *	0.247+- 0.028	1.616	0.196+- 0.023	0.793+-0.120	PB

MEAS. AMB. MASS (UG/M3): 15.3

* - FITTING ELEMENT

CMBDEQ RESULTS FOR CMB # HD527

COARSE PARTICULATE FRACTION

SAMPLING DATE: 820320 SITE CODE: 20

SAMPLING DURATION: 51 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 3.052 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.008+- 0.007	0.042+- 0.038
4	GEO-B	*	7.148+- 0.822	37.046+- 5.893
26	LIME	*	11.539+- 2.118	59.802+-12.792
47	SLAGM	*	0.459+- 0.117	2.377+- 0.661
68	MSSTK	*	0.382+- 0.065	1.978+- 0.403

TOTAL: 19.536+- 2.276 101.246+-16.212

SPECIE CODE	MEAS. UG/M3	COARSE SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO	
1 AL *	0.450+- 0.053	2.332	0.525+- 0.040	1.168+-0.136	AL
2 SI *	1.769+- 0.202	9.168	1.960+- 0.155	1.108+-0.131	SI
3 P	0.014+- 0.005	0.074	0.011+- 0.003	0.780+-0.309	P
4 S	0.368+- 0.062	1.906	0.166+- 0.012	0.450+-0.036	S
5 CL	0.075+- 0.009	0.387	0.063+- 0.005	0.847+-0.087	CL
6 K *	0.356+- 0.044	1.845	0.151+- 0.013	0.425+-0.041	K
7 CA *	4.416+- 0.499	22.888	4.061+- 0.348	0.920+-0.107	CA
8 TI *	0.025+- 0.003	0.132	0.028+- 0.002	1.090+-0.119	TI
9 Y	0.001+- 0.000	0.007	0.002+- 0.000	1.355+-0.213	Y
10 CR	0.003+- 0.000	0.015	0.002+- 0.000	0.637+-0.064	CR
11 MH *	0.012+- 0.001	0.063	0.013+- 0.001	1.090+-0.093	MH
12 FE *	0.343+- 0.039	1.776	0.311+- 0.018	0.906+-0.071	FE
13 NI	0.001+- 0.000	0.004	0.001+- 0.000	1.217+-0.300	NI
14 CU *	0.015+- 0.002	0.080	0.014+- 0.001	0.911+-0.106	CU
15 ZN *	0.060+- 0.009	0.309	0.060+- 0.005	1.000+-0.107	ZN
16 AS *	0.012+- 0.003	0.060	0.013+- 0.002	1.125+-0.216	AS
17 SE	< 0.000	---	0.000+- 0.000	4.418+-6.105	SE
18 BR *	0.001+- 0.000	0.007	0.001+- 0.000	0.997+-0.248	BR
19 SR	0.014+- 0.002	0.073	0.004+- 0.000	0.318+-0.022	SR
20 PD	< 0.001	---	0.000+- 0.001	0.000+-0.000	PD
21 AG	0.001+- 0.001	0.008	0.001+- 0.001	0.626+-0.530	AG
22 CD *	0.006+- 0.002	0.031	0.005+- 0.001	0.892+-0.276	CD
23 IH	< 0.002	---	0.000+- 0.001	0.191+-3.371	IH
24 SN	0.003+- 0.002	0.013	0.001+- 0.001	0.354+-0.479	SN
25 SB	0.005+- 0.004	0.024	0.006+- 0.002	1.369+-0.862	SB
26 BA	< 0.011	---	0.003+- 0.006	0.463+-0.989	BA
27 HG	0.001+- 0.000	0.003	0.001+- 0.000	1.249+-0.497	HG
28 PB *	0.125+- 0.017	0.647	0.128+- 0.014	1.025+-0.165	PB

MEAS. AMB. MASS (UG/M3): 19.3

* - FITTING ELEMENT

CMDEQ RESULTS FOR CMB # HT417

TOTAL PARTICULATE FRACTION

SAMPLING DATE: 820320 SITE CODE: 20

SAMPLING DURATION: 51 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.624 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.128+-	0.055	0.509+-	0.223
4	GEO-B	*	6.687+-	0.768	26.593+-	4.085
26	LIME	*	10.898+-	1.951	43.338+-	8.931
68	MSSTK	*	0.847+-	0.092	3.369+-	0.502
69	ZHSTK	*	0.171+-	0.038	0.680+-	0.168
79	WSTOV	*	11.280+-	2.002	44.860+-	9.182

TOTAL: 30.011+- 2.901 119.349+-16.771

SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	0.561+-	0.064	2.232	0.527+- 0.040	0.939+-0.097 AL
2 SI *	1.993+-	0.224	7.925	1.939+- 0.160	0.973+-0.112 SI
3 P	0.062+-	0.008	0.247	0.029+- 0.003	0.462+-0.061 P
4 S	1.365+-	0.157	5.427	0.336+- 0.017	0.247+-0.012 S
5 CL	0.067+-	0.011	0.265	0.103+- 0.006	1.543+-0.156 CL
6 K *	0.516+-	0.059	2.054	0.516+- 0.023	0.999+-0.063 K
7 CA *	3.862+-	0.433	15.358	3.890+- 0.318	1.007+-0.117 CA
8 TI *	0.022+-	0.003	0.088	0.027+- 0.002	1.215+-0.143 TI
9 V	0.001+-	0.001	0.004	0.002+- 0.000	1.597+-0.352 V
10 CR	0.004+-	0.001	0.017	0.002+- 0.000	0.397+-0.040 CR
11 MN *	0.011+-	0.001	0.044	0.011+- 0.001	0.981+-0.092 MN
12 FE *	0.314+-	0.036	1.248	0.262+- 0.017	0.833+-0.072 FE
13 NI	0.000+-	0.000	0.002	0.002+- 0.000	3.379+-1.262 NI
14 CU *	0.016+-	0.002	0.062	0.017+- 0.001	1.090+-0.132 CU
15 ZN *	0.153+-	0.017	0.608	0.153+- 0.010	1.001+-0.094 ZN
16 AS *	0.048+-	0.007	0.191	0.044+- 0.004	0.921+-0.108 AS
17 SE	0.001+-	0.000	0.006	0.001+- 0.000	0.783+-0.138 SE
18 BR *	0.010+-	0.001	0.039	0.010+- 0.003	1.000+-0.476 BR
19 SR	0.013+-	0.002	0.052	0.006+- 0.000	0.439+-0.028 SR
20 PD	<	0.002	---	0.001+- 0.000	1.356+-0.710 PD
21 AG	0.006+-	0.003	0.022	0.003+- 0.001	0.453+-0.116 AG
22 CD *	0.014+-	0.005	0.056	0.013+- 0.001	0.916+-0.129 CD
23 IH	0.009+-	0.005	0.036	0.009+- 0.001	0.049+-0.085 IH
24 SH	0.009+-	0.006	0.035	0.003+- 0.001	0.378+-0.120 SH
25 SB	<	0.009	---	0.018+- 0.002	3.784+-1.815 SB
26 BA	<	0.025	---	0.002+- 0.005	0.000+-0.000 BA
27 HG	<	0.001	---	0.002+- 0.000	3.102+-1.301 HG
28 PB *	0.275+-	0.031	1.094	0.277+- 0.023	1.006+-0.119 PB

MEAS. AMB. MASS (UG/M3): 25.1

* - FITTING ELEMENT

CMBDER RESULTS FOR CMB # HT417

TOTAL PARTICULATE FRACTION

SAMPLING DATE: 820320 SITE CODE: 20

SAMPLING DURATION: 51 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 4.692 D OF F: 8

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.134+- 0.056	0.531+- 0.231
4	GEO-B	*	7.996+- 0.772	31.798+- 4.465
26	LIME	*	10.252+- 1.921	40.770+- 8.696
68	MSSTK	*	0.849+- 0.092	3.377+- 0.504
69	ZNSTK	*	0.194+- 0.039	0.771+- 0.175

TOTAL:	19.425+- 2.073	77.248+-11.403
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SPECIE CODE	MEAS.	TOTAL UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.561+-	0.064	2.232	0.571+- 0.047	1.017+-0.118	AL
2 SI *	1.993+-	0.224	7.925	2.201+- 0.190	1.104+-0.142	SI
3 P	0.062+-	0.008	0.247	0.015+- 0.003	0.240+-0.052	P
4 S	1.365+-	0.157	5.427	0.246+- 0.016	0.180+-0.012	S
5 CL	0.067+-	0.011	0.265	0.071+- 0.005	1.066+-0.113	CL
6 K *	0.516+-	0.059	2.054	0.174+- 0.016	0.338+-0.032	K
7 CA *	3.862+-	0.433	15.358	3.701+- 0.303	0.958+-0.109	CA
8 TI *	0.022+-	0.003	0.088	0.029+- 0.002	1.333+-0.179	TI
9 V	0.001+-	0.001	0.004	0.002+- 0.000	1.654+-0.306	V
10 CR	0.004+-	0.001	0.017	0.002+- 0.000	0.436+-0.033	CR
11 MN *	0.011+-	0.001	0.044	0.011+- 0.001	0.962+-0.094	MN
12 FE *	0.314+-	0.036	1.248	0.288+- 0.020	0.918+-0.087	FE
13 NI	0.000+-	0.000	0.002	0.002+- 0.000	3.277+-0.929	NI
14 CU *	0.016+-	0.002	0.062	0.017+- 0.001	1.110+-0.133	CU
15 ZN *	0.153+-	0.017	0.608	0.153+- 0.011	1.004+-0.105	ZN
16 AS *	0.048+-	0.007	0.191	0.042+- 0.004	0.885+-0.107	AS
17 SE	0.001+-	0.000	0.006	0.001+- 0.000	0.796+-0.093	SE
18 BR *	0.010+-	0.001	0.039	0.010+- 0.003	0.994+-0.495	BR
19 SR	0.013+-	0.002	0.052	0.005+- 0.000	0.390+-0.025	SR
20 PD	<	0.002	---	0.001+- 0.000	1.099+-0.510	PD
21 AG	0.006+-	0.003	0.022	0.003+- 0.000	0.454+-0.094	AG
22 CD *	0.014+-	0.005	0.056	0.013+- 0.001	0.924+-0.117	CD
23 IH	0.009+-	0.005	0.036	0.000+- 0.001	0.025+-0.058	IH
24 SN	0.009+-	0.006	0.035	0.004+- 0.001	0.404+-0.090	SN
25 SB	<	0.009	---	0.019+- 0.002	3.873+-1.545	SB
26 BA	<	0.025	---	0.002+- 0.004	0.000+-0.000	BA
27 HG	<	0.001	---	0.002+- 0.000	3.154+-1.174	HG
28 PB *	0.275+-	0.031	1.094	0.281+- 0.023	1.020+-0.120	PB

MEAS. AMB. MASS (UG/M3): 25.1

* - FITTING ELEMENT



CMBDEQ RESULTS FOR CMB # HD540

FINE PARTICULATE FRACTION

SAMPLING DATE: 820326 SITE CODE: 20

SAMPLING DURATION: 100 HRS.

SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 9.508 D OF F: 7

CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.147+-	0.060	1.540+-	0.643
4	GEO-B	*	1.047+-	0.092	10.936+-	1.475
68	MSSTK	*	0.719+-	0.076	7.516+-	1.101
69	ZHSTK	*	0.255+-	0.046	2.669+-	0.550
70	BGSTK	*	0.091+-	0.020	0.954+-	0.229
77	SECSO	*	3.294+-	0.552	34.415+-	6.750

TOTAL: 5.554+- 0.570 58.031+- 8.395

SPECIE CODE	MEAS.	FINE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO	
1 AL *	0.137+-	0.016	1.436	0.107+-	0.010	0.778+-0.092 AL
2 SI *	0.323+-	0.036	3.377	0.342+-	0.032	1.058+-0.145 SI
3 P	0.059+-	0.007	0.617	0.009+-	0.001	0.153+-0.011 P
4 S *	0.939+-	0.106	9.813	0.939+-	0.081	1.000+-0.122 S
5 CL	<	0.003	---	0.020+-	0.004	0.000+-0.000 CL
6 K *	0.140+-	0.016	1.460	0.032+-	0.002	0.231+-0.017 K
7 CA *	0.122+-	0.014	1.271	0.129+-	0.011	1.062+-0.131 CA
8 TI *	0.005+-	0.001	0.048	0.005+-	0.000	0.987+-0.106 TI
9 V	0.000+-	0.000	0.003	0.000+-	0.000	0.797+-0.197 V
10 CR	0.000+-	0.000	0.004	0.001+-	0.000	1.310+-0.219 CR
11 MH	0.002+-	0.000	0.017	0.004+-	0.001	2.204+-0.884 MH
12 FE *	0.045+-	0.005	0.473	0.069+-	0.005	1.534+-0.200 FE
13 NI	0.001+-	0.000	0.011	0.001+-	0.000	0.944+-0.095 NI
14 CU *	0.013+-	0.002	0.138	0.012+-	0.001	0.895+-0.110 CU
15 ZH *	0.172+-	0.019	1.801	0.182+-	0.014	1.054+-0.119 ZH
16 AS *	0.059+-	0.007	0.614	0.042+-	0.004	0.717+-0.075 AS
17 SE	0.001+-	0.000	0.010	0.001+-	0.000	0.990+-0.143 SE
18 BR *	0.010+-	0.001	0.101	0.010+-	0.004	1.070+-0.579 BR
19 SR	0.001+-	0.000	0.008	0.002+-	0.000	2.020+-0.422 SR
20 PD	0.002+-	0.001	0.017	0.001+-	0.000	0.481+-0.113 PD
21 AG	<	0.001	---	0.002+-	0.000	9.999+-9.999 AG
22 CD *	0.030+-	0.004	0.309	0.032+-	0.002	1.070+-0.117 CD
23 IH	<	0.001	---	0.000+-	0.000	0.294+-0.260 IH
24 SH	0.006+-	0.001	0.060	0.004+-	0.000	0.746+-0.102 SH
25 SB	0.006+-	0.003	0.063	0.016+-	0.001	2.611+-0.675 SB
26 BA	<	0.006	---	0.004+-	0.002	0.000+-0.000 BA
27 HG	0.001+-	0.000	0.007	0.001+-	0.000	2.045+-0.539 HG
28 PB *	0.308+-	0.035	3.219	0.264+-	0.020	0.858+-0.085 PB

MEAS. AMB. MASS (UG/M3): 9.6

* - FITTING ELEMENT



CM8DEQ RESULTS FOR CMB # HD539
 COARSE PARTICULATE FRACTION
 SAMPLING DATE: 820326 SITE CODE: 20
 SAMPLING DURATION: 100 HRS.
 SITE: RESERVOIR

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.579 D OF F: 7
 CODE SOURCE FLG UG/M3 %

1	TRANS	*	0.012+-	0.007	0.110+-	0.063
4	GEO-B	*	5.921+-	0.534	54.382+-	7.795
26	LIME	*	2.981+-	0.687	27.382+-	7.008
47	SLAGM	*	0.436+-	0.111	4.004+-	1.111
68	MSSTK	*	0.467+-	0.075	4.294+-	0.839
74	CUKST	*	0.041+-	0.010	0.378+-	0.098

TOTAL: 9.858+- 0.880 90.550+-12.928

SPECIE CODE	MEAS.	COARSE UG/M3	SUSPENDED PERCENT	PARTICULATE CALC. UG/M3	RATIO
1 AL *	0.349+-	0.041	3.203	0.359+-	0.031 1.030+-0.128 AL
2 SI *	1.373+-	0.157	12.609	1.412+-	0.125 1.028+-0.131 SI
3 P	0.011+-	0.002	0.098	0.011+-	0.001 0.984+-0.157 P
4 S	0.088+-	0.025	0.806	0.120+-	0.012 1.364+-0.222 S
5 CL	0.018+-	0.002	0.163	0.028+-	0.002 1.557+-0.190 CL
6 K *	0.127+-	0.016	1.171	0.118+-	0.011 0.924+-0.115 K
7 CA *	1.439+-	0.163	13.221	1.421+-	0.101 0.987+-0.098 CA
8 TI *	0.019+-	0.002	0.174	0.020+-	0.002 1.059+-0.127 TI
9 V	0.002+-	0.000	0.015	0.001+-	0.000 0.816+-0.083 V
10 CR	0.002+-	0.000	0.017	0.001+-	0.000 0.781+-0.070 CR
11 MH *	0.009+-	0.001	0.085	0.010+-	0.001 1.118+-0.113 MH
12 FE *	0.278+-	0.032	2.556	0.242+-	0.015 0.871+-0.071 FE
13 NI	0.001+-	0.000	0.011	0.001+-	0.000 0.829+-0.115 NI
14 CU *	0.037+-	0.004	0.341	0.037+-	0.003 1.000+-0.101 CU
15 ZH *	0.064+-	0.009	0.590	0.061+-	0.005 0.948+-0.105 ZH
16 AS *	0.013+-	0.003	0.118	0.015+-	0.002 1.178+-0.242 AS
17 SE	0.000+-	0.000	0.002	0.001+-	0.000 2.513+-1.216 SE
18 BR *	0.001+-	0.000	0.013	0.001+-	0.000 1.011+-0.322 BR
19 SR	0.006+-	0.001	0.058	0.003+-	0.000 0.478+-0.038 SR
20 PD	0.001+-	0.000	0.006	0.000+-	0.000 0.498+-0.381 PD
21 AG	0.003+-	0.001	0.024	0.001+-	0.000 0.438+-0.170 AG
22 CD *	0.005+-	0.001	0.046	0.006+-	0.001 1.182+-0.298 CD
23 IH	<	0.001	---	0.000+-	0.000 0.140+-0.784 IH
24 SH	0.004+-	0.001	0.034	0.001+-	0.001 0.273+-0.181 SH
25 SB	0.006+-	0.002	0.057	0.008+-	0.002 1.257+-0.426 SB
26 BA	<	0.006	---	0.003+-	0.003 1.651+-3.145 BA
27 HG	0.000+-	0.000	0.005	0.001+-	0.000 1.691+-0.665 HG
28 PB *	0.175+-	0.023	1.606	0.146+-	0.018 0.837+-0.131 PB

MEAS. AMB. MASS (UG/M3): 10.9
 * - FITTING ELEMENT

Wilson Jones Quality Control

C447-13 Redi-Cover 1000

C447-13	RED	94713
C447-13B	BLACK	94713
C447-13B1	DARK BLUE	94713
C447-13B2	LIGHT BLUE	94713
C447-13B3	YELLOW	94713

